1999 Biennial Energy Report

Challenges and Opportunities for Washington's Energy Future

Tim Douglas
Director

January 1999

The CTED Energy Division's *1999 Biennial Energy Report: Challenges and Opportunities for Washington's Energy Future* is now available for downloading. The 1999 Biennial Report is a collection of documents that address some of the most pressing energy-related challenges and promising opportunities Washington faces.

Message from the Director

The Energy Division of the Department of Community, Trade and Economic Development is pleased to submit the 1999 Biennial Energy Report called for in RCW 43.21F.045. An overview of the issues covered in the report is included at the beginning. We hope this report provides you with useful energy information and background to assist in making sound energy policy decisions during the 1999 Legislative Session.

The 1999 Biennial Report is a collection of documents that address some of the most pressing energy-related challenges and promising opportunities Washington faces. The report includes the following sections:

- **Energy Indicators** – A quantitative look at some of the most important dimensions of the energy picture in Washington, including prices, consumption, environmental impacts, and efficiency.

- **Washington State Electricity System Study - Executive Summary** – Prepared in compliance with ESSB 6560.

- **Energy Facility Site Evaluation Council (EFSEC)** – Description of functions and challenges.

- **Next Generation of Energy – Executive Summary –** Description of energy efficiency and renewable resource industries in Washington.

- **Year 2000 and Electric Utilities –** Description of preparations to avert Y2K problems in the electric industry.

- **Washington's Energy Strategy Status Report** – Description of implementation of provisions of Washington's Energy Strategy.

We look forward to working with you during this legislative session to enhance our achievement of energy policy goals and to help deliver affordable, reliable, environmentally sound energy service to the citizens of Washington.

If you have any questions, or would like to discuss any of the issues presented in the 1999 Biennial Energy Report, please contact K.C. Golden, Assistant Director of the Energy Division, or other EFSEC or Policy staff listed in the directory on the back cover of this report.

Tim Douglas
Director

Contents

Biennial Report – Overview

The 1999 Biennial Report consists of six substantive sections:

1. Energy Indicators

This section provides one-page summaries of significant long-term energy trends in Washington. Energy consumption, expenditure, and price data from standard sources are presented using economic, demographic, and environmental information to depict energy information in a broad context. Indicators are presented in the following categories:

- Washington's energy use
- Washington's energy bill
- Washington's energy intensity
- End-use sector trends
- Energy price trends
- Environmental trends

2. Washington State Electricity System Study – Executive Summary

This report, prepared under the provisions of ESSB 6560 provides information about Washington's electric utility industry, identifies trends affecting the industry and consumers, and identifies strategies for achieving policy objectives. It identifies a growing tension between preserving the desirable characteristics of the existing system and responding to a changing electric power market. The report includes sections on:

- Washington's electricity landscape
- Trends affecting electric service costs
- Strategies to minimize electric service costs
- Electricity rates and equity: the potential for cost-shifting
- Utility service territory agreements in Washington
- Consumer protection policies and procedures
- Service quality
- Electricity service reliability
- Conservation, renewables, and low-income energy services

3. Siting and Regulating Major Energy Facilities

The Energy Facility Site Evaluation Council (EFSEC) continued to provide a "one-stop" siting process as well as regulatory oversight of permitted and operating major energy facilities in Washington. EFSEC's siting activities included a coordinated environmental review for a controversial proposed cross-state petroleum product pipeline with opportunities for public participation, and planning for formal administrative hearings on contested issues. EFSEC continued its environmental regulatory oversight of the Washington Public Power Supply System's operating nuclear power plant WNP-2 and the four partially constructed nuclear power plants. EFSEC reviewed and approved requests from some permitted (but not yet constructed) natural gas-fired combustion turbine projects to extend their air emissions permits.

4. The Next Generation of Energy: Renewable Energy and Energy Efficiency Industries in Washington State – Executive Summary

This report was prepared for the Energy Division by an independent consultant to document the nature, challenges, and opportunities facing the energy efficiency and renewable energy industries in Washington. It finds that the energy efficiency industry generates annual sales of about $780 million and employs approximately 2,900 people earning wages of $128 million. The renewable energy industry generates sales of $147 million and employs 900 people earning wages of over $32 million. Near-term challenges include reduced utility investment in efficiency and renewables and stiff competition from efficient combustion turbines burning relatively low-cost natural gas. Overseas markets, policy initiatives to reduce greenhouse gases, and proposals to restore utility investment through competitively neutral funding mechanisms represent substantial opportunities for these industries.

5. Year 2000 and Electric Utilities

Electric utilities in Washington are increasingly optimistic that they will be able to continue to provide critical energy services to individuals, businesses, government, and industry during the transition to the next millennium. This section provides:

- an overview of the types of electric utilities in Washington State;
- a description of the roles of the Western Systems Coordinating Council, the North American Electric Reliability Council, and the Washington Utilities and Transportation Commission in electric utility preparation for Y2K; and
- summaries of preparedness activities provided by the Bonneville Power Administration, the Association of Washington Cities, the Washington Public Utility District Association, and the Washington Rural Electric Cooperative Association.

6. Washington's Energy Strategy

In 1991, the Legislature called on the Governor to appoint a group of citizens, representatives of business and industry, and public officials to develop an energy strategy to assure reliable, economical, and environmentally sound energy service. This Committee developed a strategy that includes recommendations for transportation; energy for buildings, farms, and industry; protecting the environment; siting energy facilities; and public awareness and education. In 1994, the Legislature enacted ESB 6493, which made the Energy Strategy the primary guidance for implementation of state energy policy. The 1999 Biennial Report provides a detailed status report on implementation of the Energy Strategy.

Section 1: Energy Indicators

Contents

Introduction

Energy is a critical component of every aspect of Washington's economy and is used daily by every resident of the state to meet the most basic human needs. Energy lights and heats our homes, cooks our food, fuels our vehicles, and powers our industries. Without it, our society would literally grind to a halt. But few of us have a thorough understanding of key trends taking place in this crucial industry. This section presents a series of 25 "Energy Indicators", illustrating some of the most important long-term energy trends. Each indicator consists of a chart based on readily available energy, economic, and demographic information, a caption highlighting key trends depicted in the chart, and narrative giving additional perspective or describing further aspects of the indicator.

The Energy Indicators are the successor to the *Washington State Energy Use Profile*, published periodically in the past by the Washington State Energy Office, most recently in June of 1996. They complete the evolution begun with the last *Profile* away from the dissemination of raw data, most of which is publicly available from other sources, towards a product that combines and interprets energy data in a format that is, we hope, more interesting and informative for policy-makers, the media, and the general public.

In order to ensure that the Energy Indicators presented here are grounded in the best available information and can be updated on a regular basis, they are based exclusively on regularly published data from sources in the public domain. The Energy Information Administration's *State Energy Data Report* and *State Energy Price and Expenditure Report* are the most complete sources of annual, state-level energy data. They form the foundation upon which the Energy Indicators are based. Unfortunately, collecting and publishing detailed statistics on energy consumption, price, and expenditures for fifty states and the District of Columbia is an enormous task, so information from these sources tends to lag by two to three years. Consequently, the Energy Indicators are confined to analysis of long-term energy trends.

Additional sources of data employed in this report include the U.S. Commerce Department's Bureau of Economic Analysis and Bureau of the Census, the U.S. Department of Transportation's Federal Highway Administration and Bureau of Transportation Statistics, the U.S. Environmental Protection Agency, the Washington State University Energy Program, the Oak Ridge National Laboratory, and numerous additional EIA publications.

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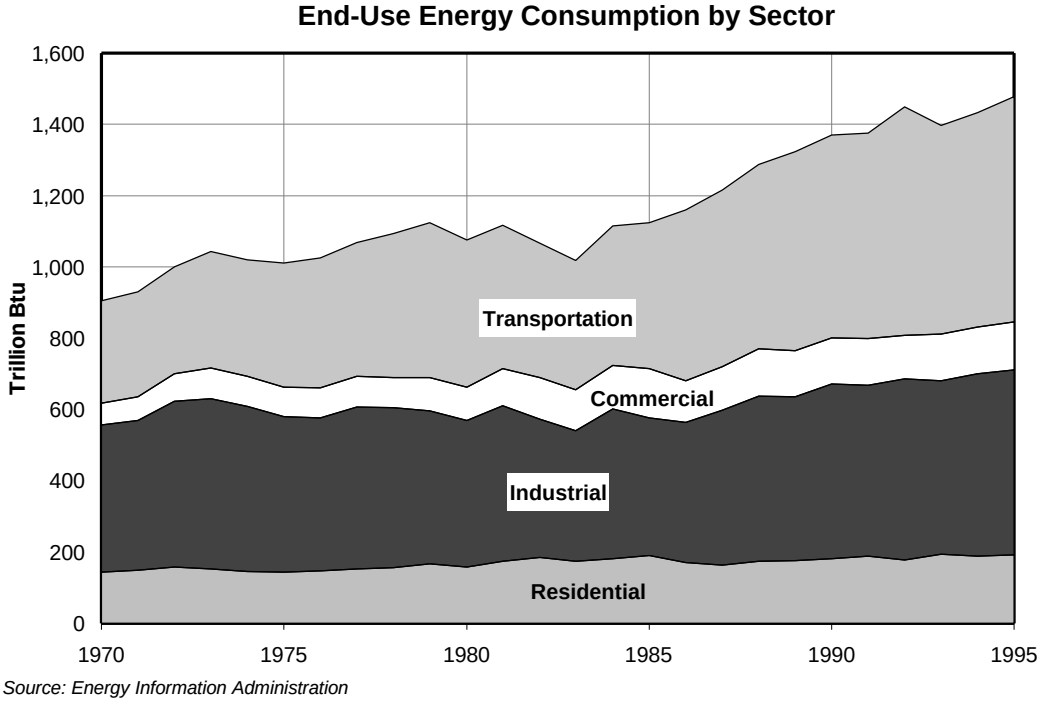
1. Washington's Energy Use — End-Use Energy Consumption



Source: Energy Information Administration

END USE ENERGY CONSUMPTION IN WASHINGTON WAS 63 PERCENT HIGHER IN 1995 THAN IN 1970. MOST OF THE INCREASE OCCURRED IN THE TRANSPORTATION SECTOR, WHERE ENERGY USE HAS MORE THAN DOUBLED SINCE 1970. TRANSPORTATION NOW ACCOUNTS FOR MORE THAN HALF OF THE STATE'S ENERGY CONSUMPTION.

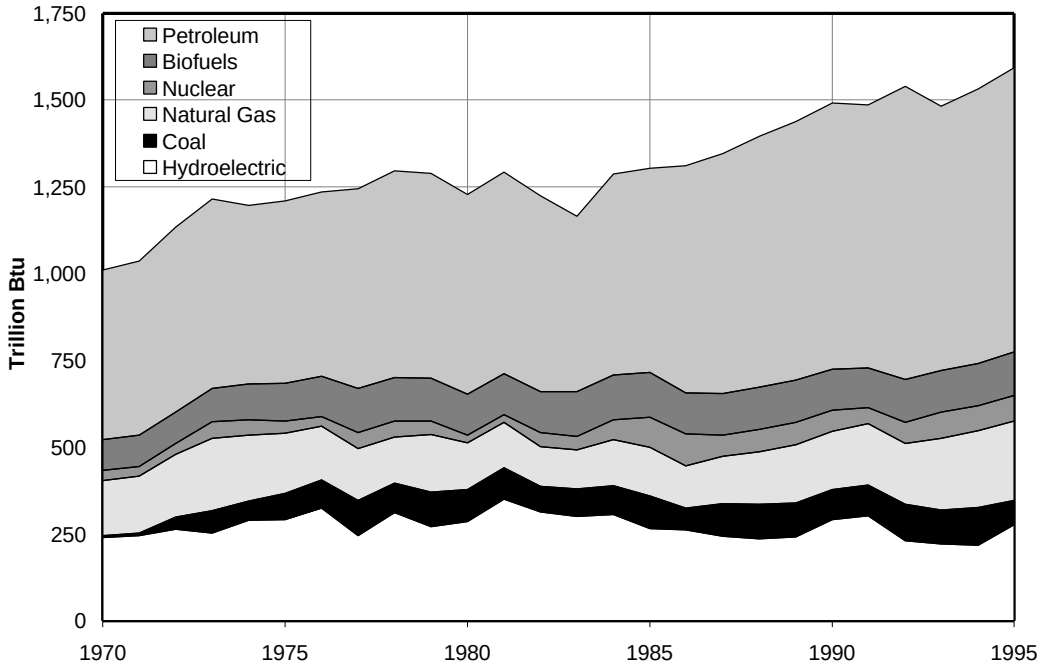
Washington's end-use energy consumption grew at 2.8 percent per year between 1993 and 1995, reaching an all-time high of 1.5 quadrillion Btu in 1995. The transportation sector accounts for the largest share of growth in energy consumption, growing at an annual rate of 4.4 percent since 1985.

During the 1970s and early 1980s, growth in energy consumption was dampened by higher energy prices and changes in the state's economy. Industrial sector energy consumption declined by 6.5 percent between 1970 and 1985. Energy consumption in the commercial sector, which includes service industries such as finance, insurance, and real estate, more than doubled over the same period, but remains small relative to other sectors.

The period since 1985 has been characterized by resurgence in the industrial sector, where energy consumption grew at 3.1 percent per year between 1985 and 1995, and rapid growth in the transportation sector. After spiking in the late 1970s and early 1980s, energy consumption in the commercial and residential sectors has been flat since 1985.

2. Washington's Energy Use — Primary Energy Consumption

Total Primary Energy Consumption by Source



Source: Energy Information Administration

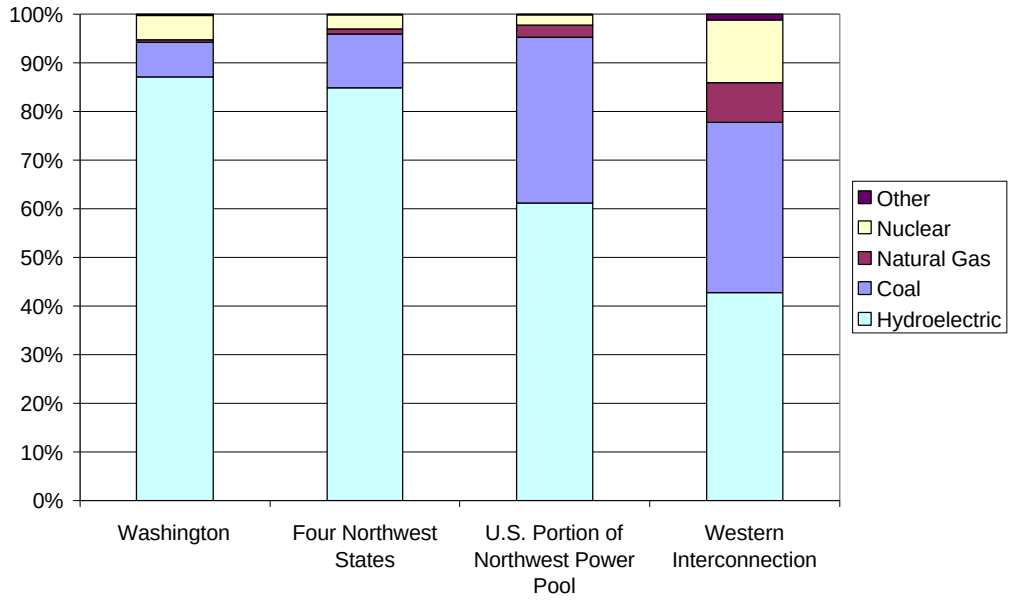
Data Note: EIA uses each state's mix of electric generation to map electricity consumption to production by primary fuels. This overstates the contribution of hydroelectricity, as Washington is part of an interconnected regional electric grid and relies on generation sources in other states that are less hydroelectric-intensive.

WASHINGTON CONTINUES TO RELY ON PETROLEUM FUELS TO MEET OVER HALF ITS ENERGY NEEDS. THE RELATIVE IMPORTANCE OF HYDROELECTRICITY AS AN ENERGY SOURCE HAS DECLINED.

This indicator shows the extent of Washington's reliance on six major primary energy sources: petroleum, hydroelectricity, natural gas, biofuels, coal, and uranium.[1] Washington continues to rely on petroleum, most of which is imported by tanker from Alaska, to meet over half of its primary energy needs. This share has not changed appreciably since 1970. Hydroelectricity's relative importance has declined since the mid 1980s, due to stable production and rapid growth in other fuels. Natural gas consumption doubled between 1983 and 1995, regaining the market share it lost during the 1970s. Natural gas now accounts for nearly 15 percent of Washington's primary energy consumption. Biofuels, mainly wood and wood waste products, account for 8 percent of primary energy consumption. These fuels are primarily burned for steam and cogeneration at pulp and paper mills. Coal is consumed almost exclusively at the Centralia Steam Plant, while uranium is used at the Washington Public Power Supply System's WNP-2 plant in Richland. Together, coal and nuclear generation accounted for 9 percent of Washington's primary energy supply in 1995.

3. Washington's Energy Use — Electricity Generation

1996 Electricity Generation by Fuel Type, Four Geographies



Source: Energy Information Adminsitration

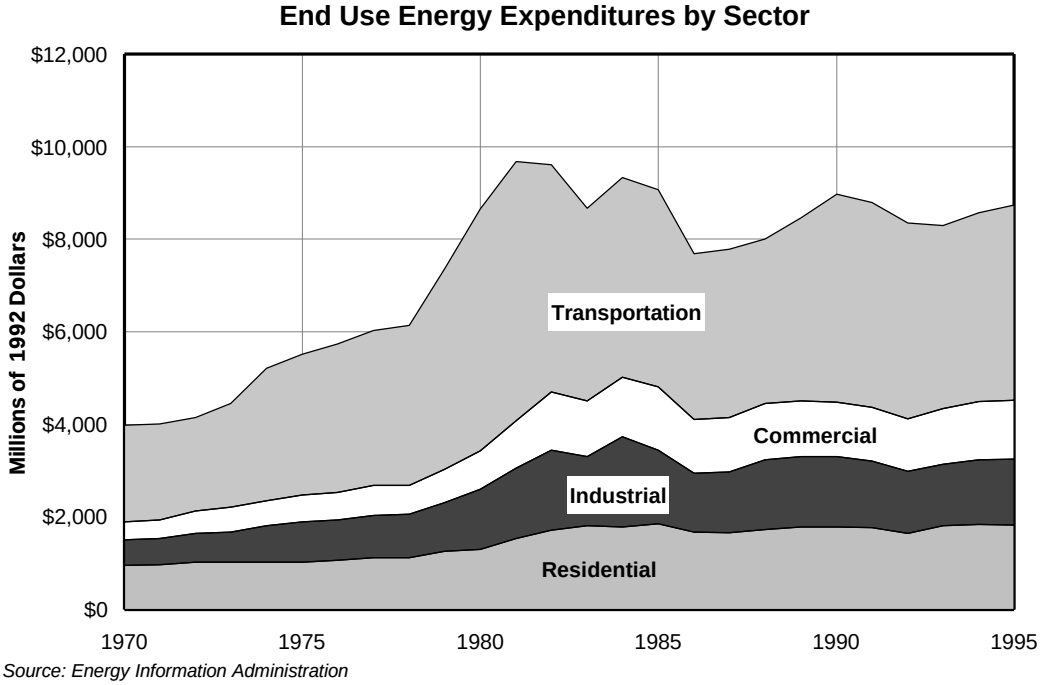
WHILE 85 PERCENT OF ELECTRICITY GENERATED IN WASHINGTON COMES FROM HYDROELECTRIC DAMS, WASHINGTON CONSUMERS ARE SERVED BY ELECTRICITY FROM GENERATING PLANTS LOCATED THROUGHOUT THE WESTERN INTER-CONNECTION. MANY OF THESE PLANTS ARE FIRED BY COAL OR NATURAL GAS.

How much of Washington's electricity is hydro? The answer depends on how one defines "Washington's electricity". While hydroelectric dams accounted for 85 percent of the electricity generated in Washington in 1996, Washington is part of an interconnected, regional bulk power system and Washington consumers are dependent on coal, natural gas, and nuclear plants in other states. Moreover, much of the hydroelectric generation in Washington is owned by the federal government and operated on behalf of customers in multiple states.

A better proxy for "Washington's electricity" might be the mix of generation in the U.S. portion of the Northwest Power Pool (NWPP) [2]. This incorporates coal plants in Oregon, Montana, Wyoming, and Utah owned by utilities that serve Washington customers. Hydroelectric dams accounted for 61 percent of NWPP generation in 1996, while 34 percent came from coal-fired plants.

However, this still ignores seasonal purchases of nuclear, coal and gas-fired electricity from the Southwest. The 1996 generation mix for the U.S. portion of the Western Interconnection [3] was 43 percent hydro, 35 percent coal, 13 percent nuclear, and 8 percent natural gas.

4. Washington's Energy Bill — End Use Energy Expenditures



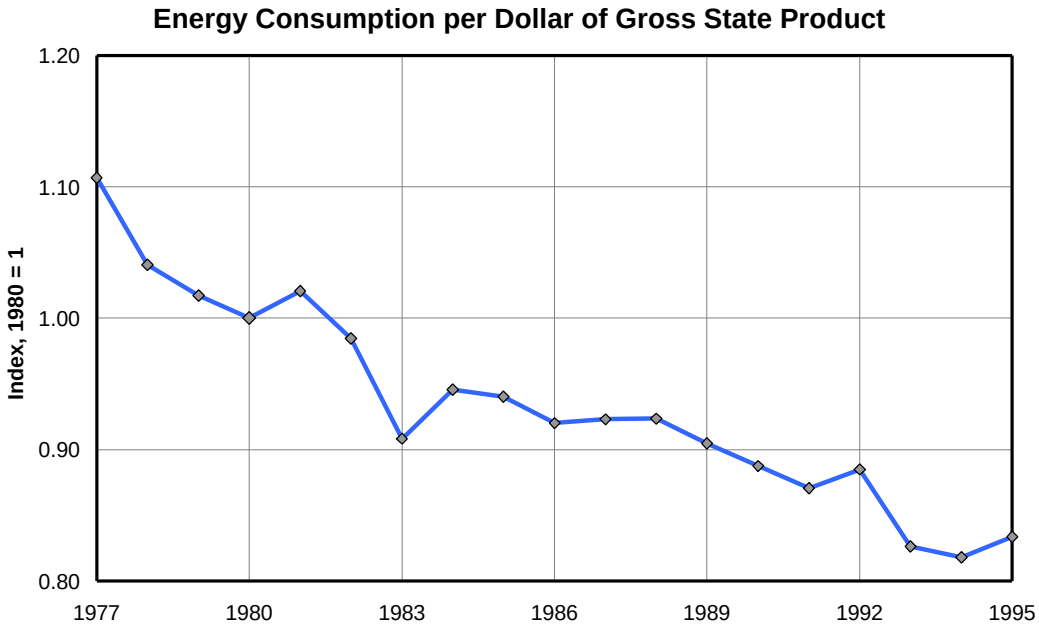
Source: Energy Information Administration

ADJUSTED FOR INFLATION, ENERGY EXPENDITURES IN WASHINGTON IN 1995 ARE SIMILAR TO 1980, DESPITE A 37 PERCENT INCREASE IN ENERGY CONSUMPTION DURING THAT PERIOD.

Washingtonians spent $9.4 billion on energy in 1995. While that represents a 60 percent increase over 1980 in nominal terms, when adjusted for inflation the amounts are approximately the same, despite a 37 percent increase in energy consumption. Energy prices have not kept pace with inflation since oil prices peaked in the early 1980s. This period contrasts sharply to the 1970s, when expenditures on energy increased by 150 percent in real terms.

The transportation sector accounts for the largest share of energy expenditures, nearly 50 percent in 1995. This proportion declined, however, from 60 percent in 1980, even as transportation's share of statewide energy consumption increased. The real price of petroleum fuels has declined significantly since 1980, while the price of electricity, the largest energy source in the residential and commercial sectors, has stayed constant.

5. Washington's Energy Intensity — Energy Consumption per Dollar of GSP



Sources: Energy Information Administration, Bureau of Economic Analysis

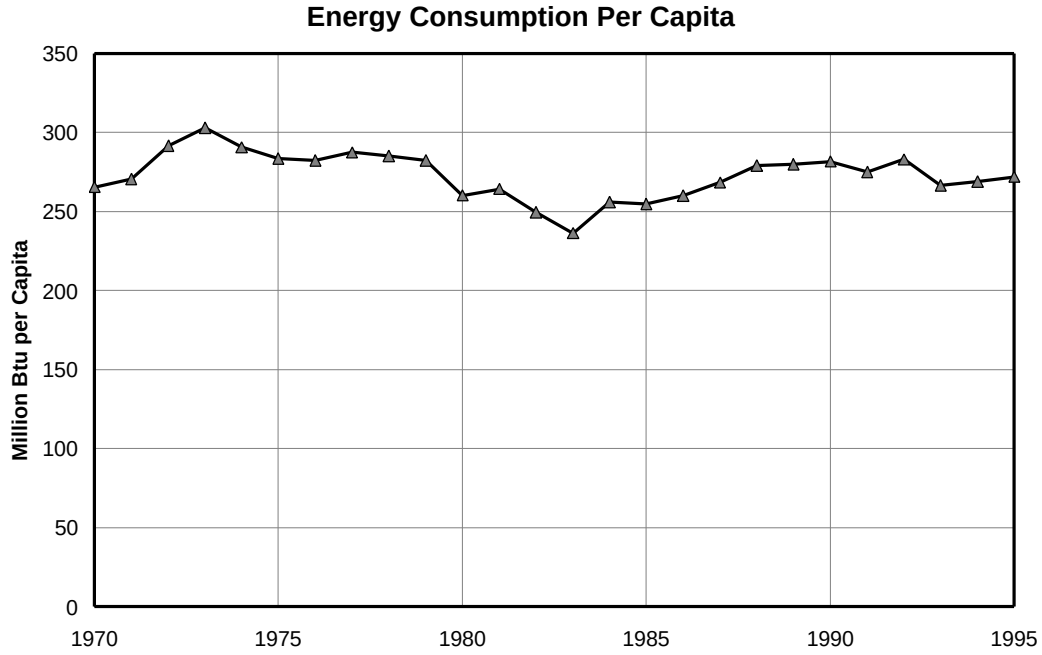
Data Note: Irregularities in 1983 and 1992 are caused by volatility in certain petroleum fuels, particularly residual fuel, which is often purchased in bulk and used over longer periods of time.

WASHINGTON CONTINUES TO PRODUCE MORE GOODS AND SERVICES PER UNIT OF ENERGY CONSUMED, DESPITE GROWTH IN TOTAL ENERGY CONSUMPTION. KEY REASONS ARE A SHIFT IN THE STATE'S ECONOMY TO LESS ENERGY-INTENSIVE INDUSTRIES AND IMPROVED PROCESS EFFICIENCY.

This report presents several measures of Washington's energy intensity, the extent to which the state relies on energy to fuel its economy and meet its everyday needs. The first measures the energy intensity of Washington's economy, by depicting the amount of energy we use to produce a dollar's worth of economic output. Washington energy consumption is divided by Gross State Product (GSP), the sum of all goods and services produced in the state, and the result is indexed so that the value in 1980 is equal to 1. Despite the rapid increase in Washington's total energy consumption between 1980 and 1995, energy consumption per dollar of GSP declined by 17 percent over the period.

Washington's economy is growing faster than its energy consumption, and has been since at least 1977, when the Gross State Product data series we use begins. This is due to a number of factors, chief among them a shift in the state's economy from its resource and manufacturing base to software, biotech, and other, less energy intensive industries. Gains in energy efficiency have also contributed.

6. Washington's Energy Intensity — Energy Consumption per Capita

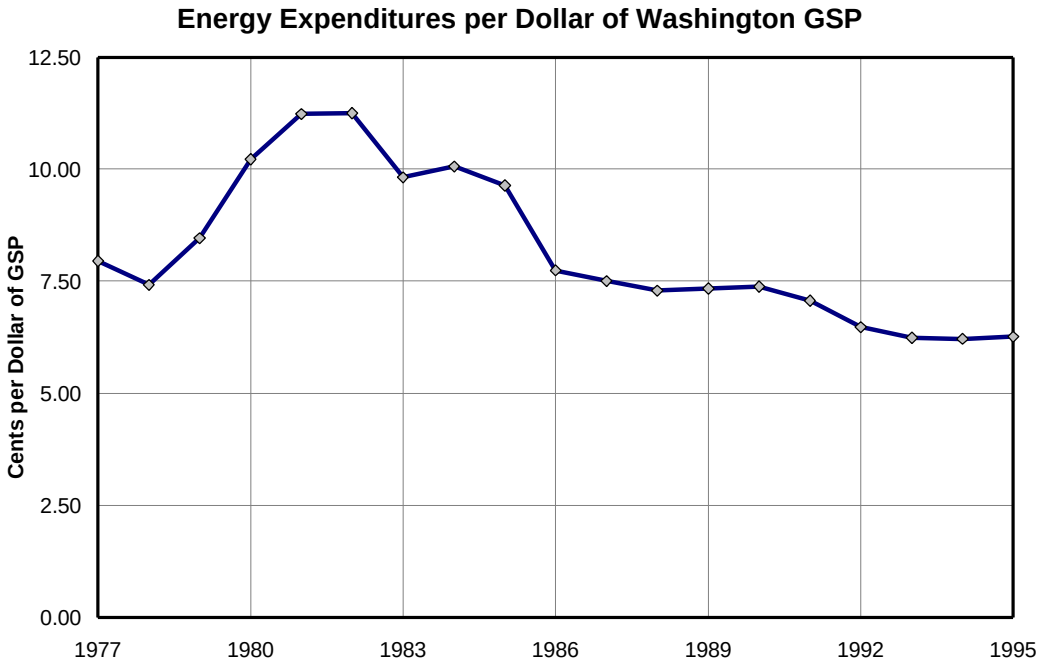


Sources: Energy Information Administration, Bureau of the Census

ENERGY CONSUMPTION PER CAPITA IS SIMILAR TODAY TO LEVELS IN 1970. PER CAPITA CONSUMPTION REACHED A LOW IN 1983, BUT GROWTH IN TRANSPORTATION ENERGY CONSUMPTION HAS LED TO STEADY INCREASES SINCE THEN.

Another way to look at Washington's energy intensity is energy consumption per capita. While the previous indicator demonstrated that Washington continues to create more wealth per unit of energy, here the story is somewhat different. Washington's per capita energy consumption in 1995 was 272 million Btu. That's the equivalent of approximately 2,200 gallons of gasoline per person, and is identical to the figure for 1971. Energy consumption per capita declined after 1973 to a low of 236 million Btu per person in 1983, a decline of 21 percent. This was followed by a period of rapid growth between 1983 and the end of the decade. Most of the increase occurred in transportation fuels, as communities began to sprawl and Washingtonians drove more and more miles per year.

7. Washington's Energy Intensity — Energy Expenditures and Gross State Product



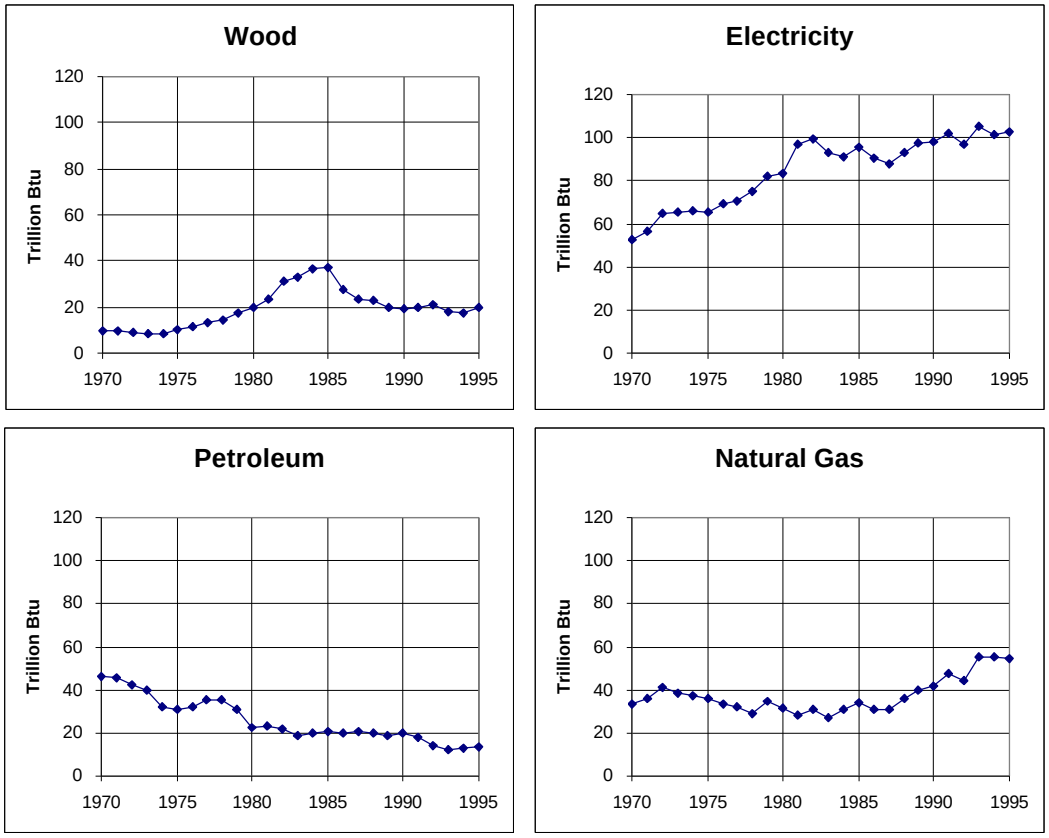
Sources: Energy Information Administration, Bureau of Economic Analysis

Data Note: These figures include both household consumption and personal transportation.

ENERGY EXPENDITURES ARE DECLINING RELATIVE TO ECONOMIC OUTPUT, DESPITE GROWTH IN ENERGY CONSUMPTION. PRINCIPAL CAUSES ARE DECLINING ENERGY INTENSITY AND LOWER ENERGY PRICES.

This indicator divides statewide energy expenditures by economic output, in the form of Gross State Product. The result is an estimate of the significance of energy in Washington's economy. Approximately 6.3¢ is spent on energy in Washington for every dollar of gross state product. This number has been declining steadily since peaking at nearly 12¢ in 1982. Two trends have contributed to this decline: Washington's economy is becoming less energy-intensive and energy prices have declined. Today, energy expenditures are smaller relative to Washington's economy than at any time in history.

8. Residential Sector Trends — End-Use Energy Consumption by Fuel



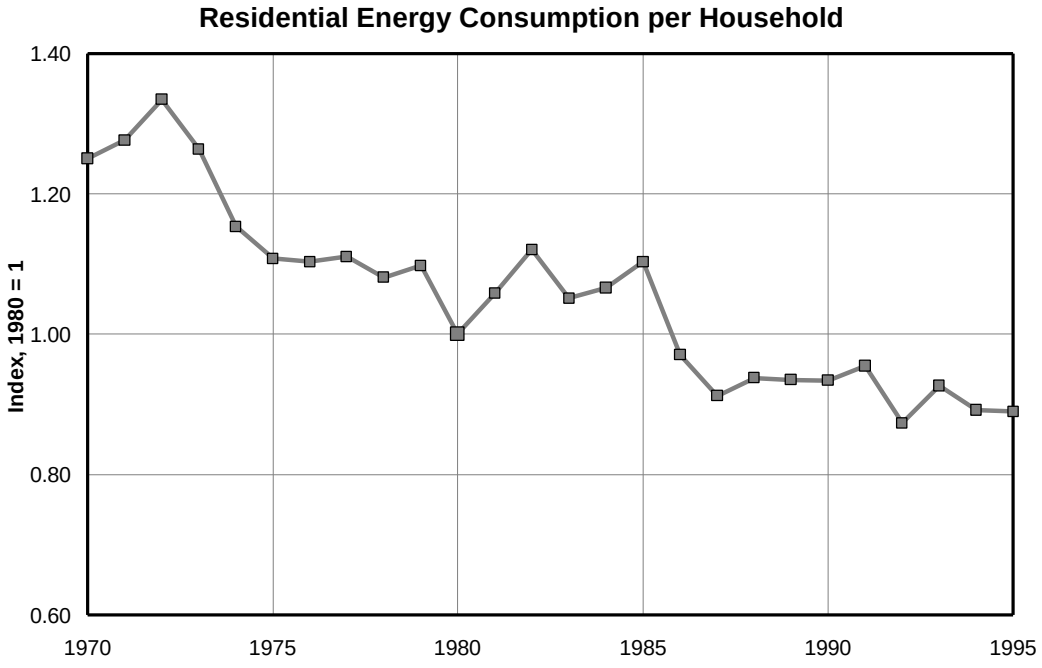
Source: Energy Information Administration

GROWTH IN HOUSEHOLD ELECTRICITY CONSUMPTION HAS SLOWED IN THE LAST 15 YEARS, WHILE GROWTH IN NATURAL GAS USE HAS ACCELERATED. WOOD AND OIL CONSUMPTION CONTINUE TO DECLINE.

Electricity accounts for the majority of residential energy consumption, but average electricity use per household has declined since 1980. Growth in natural gas consumption has accelerated; residential sector gas use grew at 1.9 percent per year between 1980 and 1985, 3.9 percent per year between 1985 and 1990, and 5.7 percent per year between 1990 and 1995.

Consumption of firewood grew in the late 1970s and early 1980s in response to high heating oil prices. Environmental restrictions and the increasing popularity of gas appliances have contributed to declining wood consumption in the last ten years. Home heating oil consumption continues to fall, from 300 gallons per household in 1970 to less than 50 gallons in 1995.

9. Residential Sector Trends — Household Energy Intensity



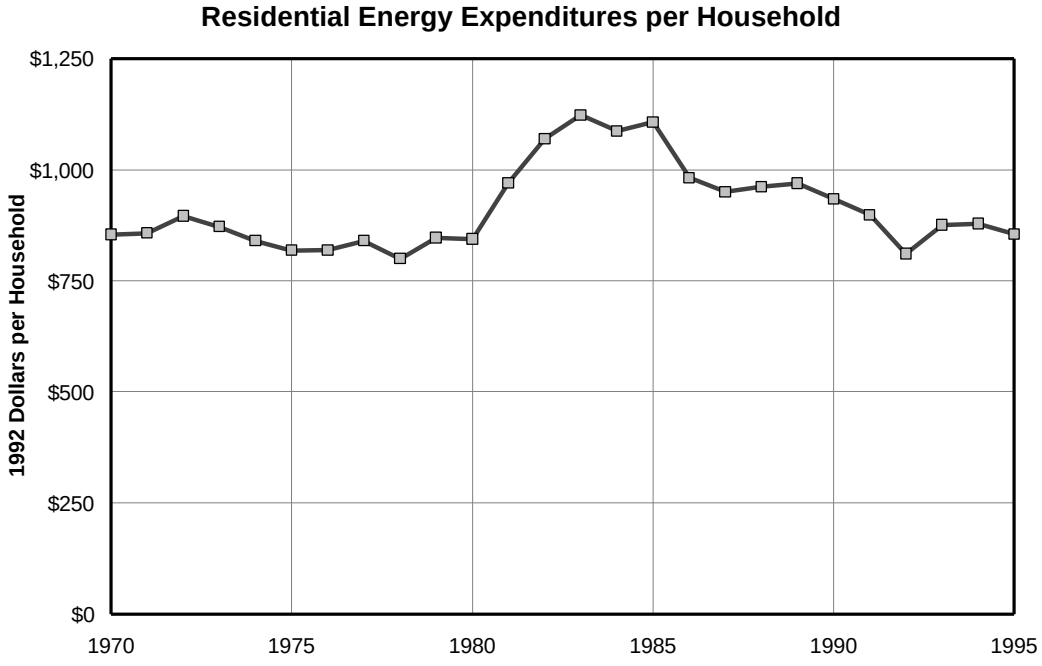
Sources: Energy Information Administration, Bureau of the Census

ENERGY CONSUMPTION PER WASHINGTON HOUSEHOLD HAS DECLINED BY MORE THAN A THIRD SINCE PEAKING IN 1972, SUGGESTING AN IMPROVEMENT IN HOUSEHOLD ENERGY EFFICIENCY. GAINS HAVE SLOWED IN RECENT YEARS.

Washington households continue to become more energy efficient. Energy consumption per household has declined by nearly 20 percent since 1985, a rate of 2.1 percent per year. The 1970s were characterized by declining oil and natural gas consumption, with gas use per household falling by 33 percent between 1970 and 1980. Oil consumption dropped from 300 gallons per household in 1970 to 85 in 1983, with half the decline occurring after the second oil shock in 1978. A number of households may have switched to wood as a primary source of space heating during this time. Electricity consumption per household began to decline in the early 1980s after decades of growth. Despite larger houses and the recent proliferation of electricity-using appliances, electricity consumption per household declined by 14 percent between 1985 and 1995.

The trend toward lower household energy consumption has slowed recently, as declines in wood and petroleum consumption during the 1990s have been offset by increasing natural gas consumption. Moreover, these data do not include energy used for personal transportation, which has increased markedly during the last fifteen years.

10. Residential Sector Trends — Household Energy Bill



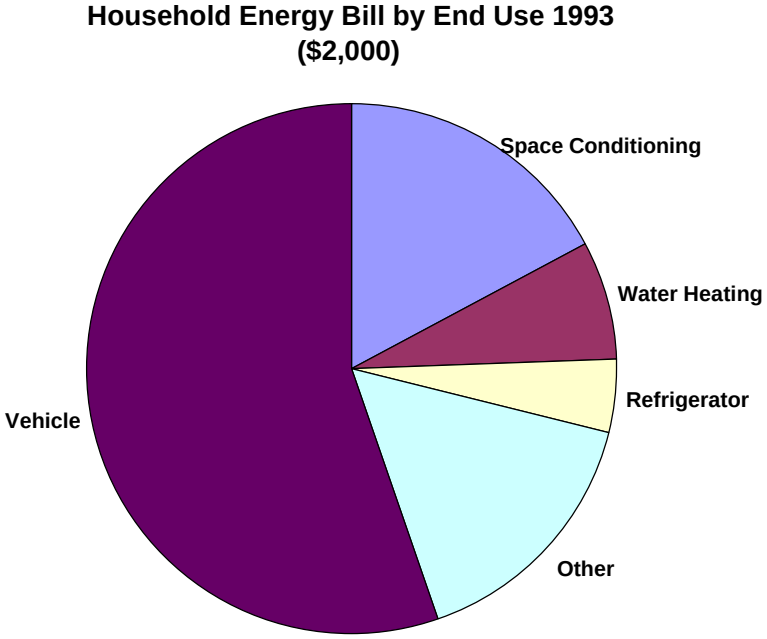
Sources: Energy Information Administration, Bureau of the Census

ADJUSTED FOR INFLATION, THE AVERAGE WASHINGTON HOUSEHOLD SPENT THE SAME AMOUNT FOR HOME ENERGY IN 1995 AS IN 1970. IMPROVEMENTS IN HOUSEHOLD ENERGY EFFICIENCY AND FUEL SWITCHING TO LESS EXPENSIVE FUELS HAVE OFFSET HIGHER ELECTRICITY PRICES.

In 1995, the average Washington household spent the inflation-adjusted sum of $872 for electricity, natural gas and petroleum delivered to the home, identical to the figure in 1970. This outward similarity masks significant changes in the composition of household energy expenditures over the last 25 years. Increased emphasis on energy conservation and fuel-switching from heating oil to wood (much of which is harvested free of charge) helped to mitigate the impact of the oil shocks of the 1970s on the home energy bill of Washington households. However, there is no immediate substitute for electricity, so when electricity prices increased by 62 percent between 1980 and 1983, due largely to the inclusion in rates of the WPPSS nuclear bonds, the average household electricity bill increased by a like amount.

Over the long run, energy efficiency and fuel-switching have helped reduce household consumption of relatively expensive electricity. The electricity bill for the average Washington household dropped by 18 percent between 1985 and 1995; usage per household fell 14 percent. Many households saved by switching to natural gas; the average gas bill fell by 17 percent between 1985 and 1995, despite a 27 percent increase in per household consumption.

11. Residential Sector Trends — Household Energy Bill with Transportation



Source: Energy Information Administration, Residential Energy Consumption Survey

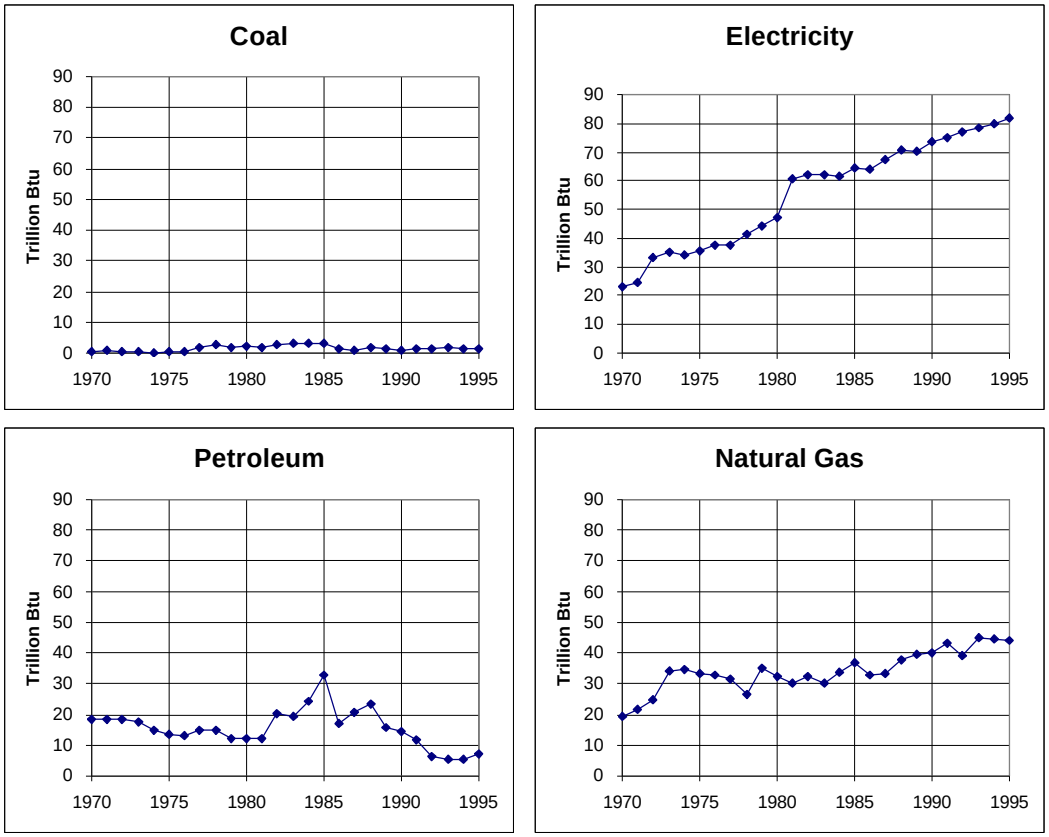
Data Note: These detailed figures about household energy expenditures were obtained from a different source than data used elsewhere in this report. As a result, this estimate of the average household energy bill differs slightly from that in the previous indicator.

INCLUDING ENERGY USED FOR PERSONAL TRANSPORTATION MORE THAN DOUBLES THE ANNUAL ENERGY BILL FOR THE AVERAGE WASHINGTON HOME.

The average household in Washington spent 55 percent of its energy budget fueling vehicles for transportation in 1993. This share has increased dramatically in the last two decades. While homes are becoming more energy efficient, they are increasingly located at large distances from where people work, shop, and recreate.

After personal transportation, major categories of household energy expenditures include space conditioning (heating, cooling, and ventilation), water heating, refrigerators, lighting, household appliances, and electronic equipment.

12. Commercial Sector Trends — End-Use Energy Consumption by Fuel

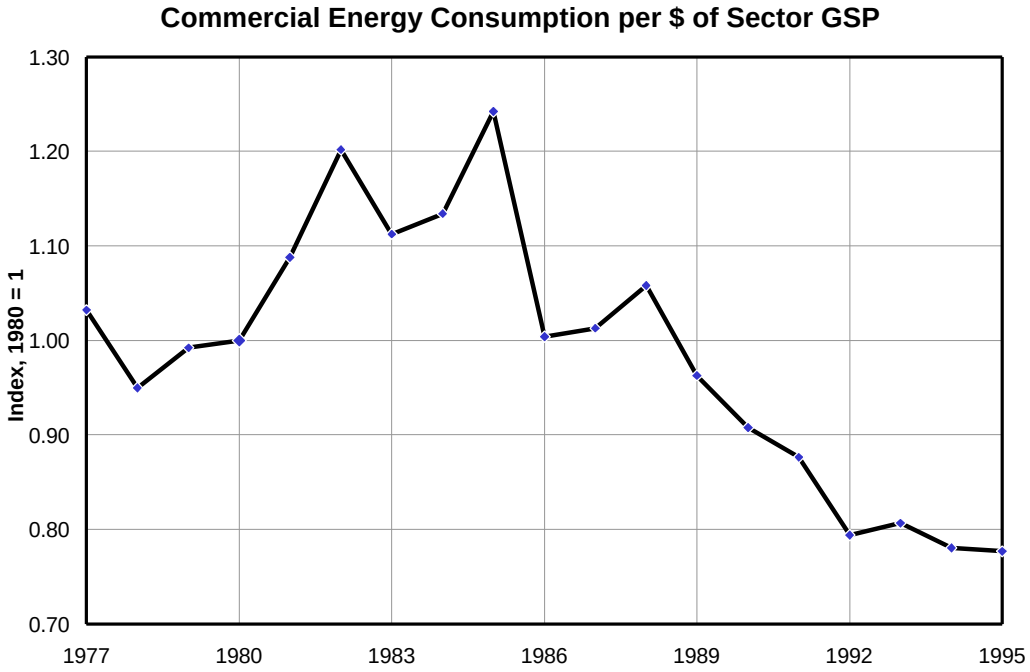


Source: Energy Information Administration

ELECTRICITY ACCOUNTS FOR OVER 60 PERCENT OF END-USE ENERGY CONSUMPTION IN THE COMMERCIAL SECTOR. NATURAL GAS MAKES UP THE BULK OF THE REST. BOTH GAS AND ELECTRICITY CONSUMPTION CONTINUE TO GROW AT 2 PERCENT PER YEAR.

Electricity and natural gas are the dominant fuels in Washington's commercial sector. With escalating use of electricity-consuming equipment such as computers, printers, and photocopiers, the commercial sector has become increasingly reliant on electricity during the last two decades. Commercial sector electricity consumption has nearly quadrupled since 1970. Natural gas lost market share in the late 1970s and early 1980s, but has recovered rapidly since 1985. In contrast, petroleum consumption is less than half of early 1970s levels, declining from 30 percent of commercial energy consumption in 1970 to around 5 percent in 1995.

13. Commercial Sector Trends — Commercial Sector Energy Intensity

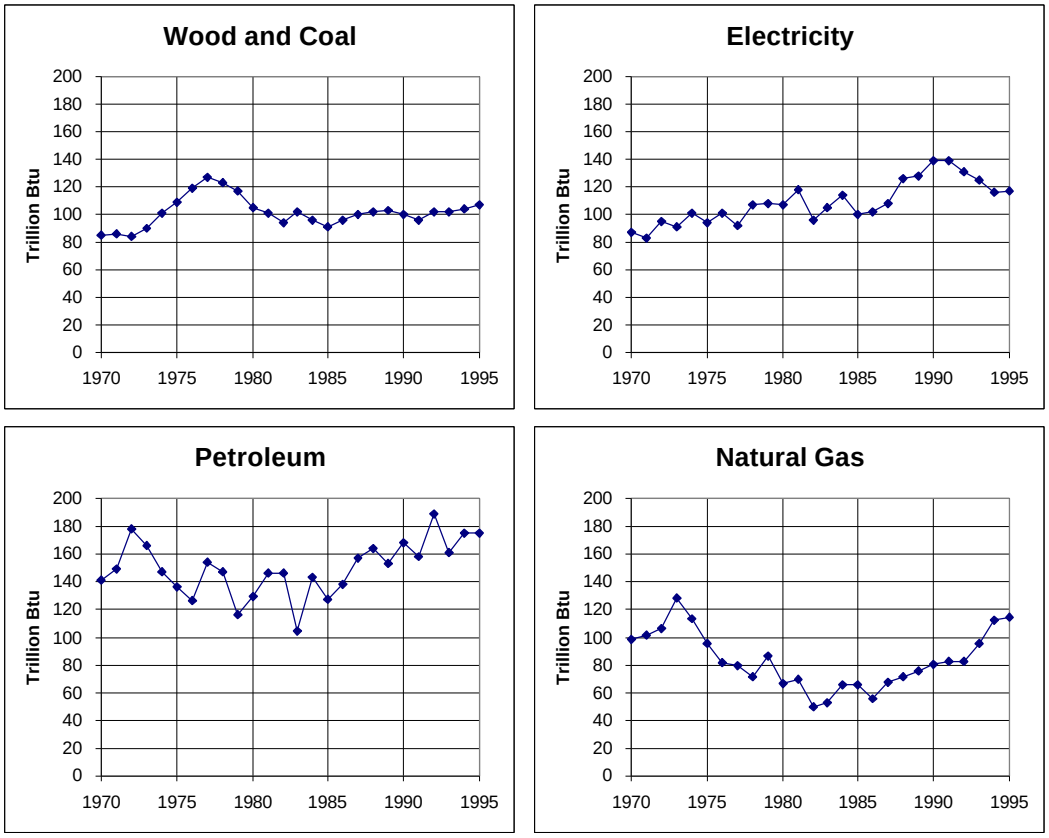


Sources: Energy Information Administration, Bureau of Economic Analysis

COMMERCIAL SECTOR ENERGY CONSUMPTION HAS DECLINED RAPIDLY RELATIVE TO ECONOMIC OUTPUT SINCE THE MID-1980S.

Washington's commercial sector has become much less energy intensive over the last 15 years. Commercial sector energy consumption increased more than 50 percent between 1977 and 1985, but has since declined slightly. Meanwhile, the value of all goods and services produced by the commercial sector has more than doubled in real terms since 1977 and continues to grow at 4 percent per year. Increased productivity and improvements in the efficiency of buildings, lighting, and equipment have played a major role in declining commercial sector energy intensity.

14. Industrial Sector Trends — End-Use Energy Consumption by Fuel



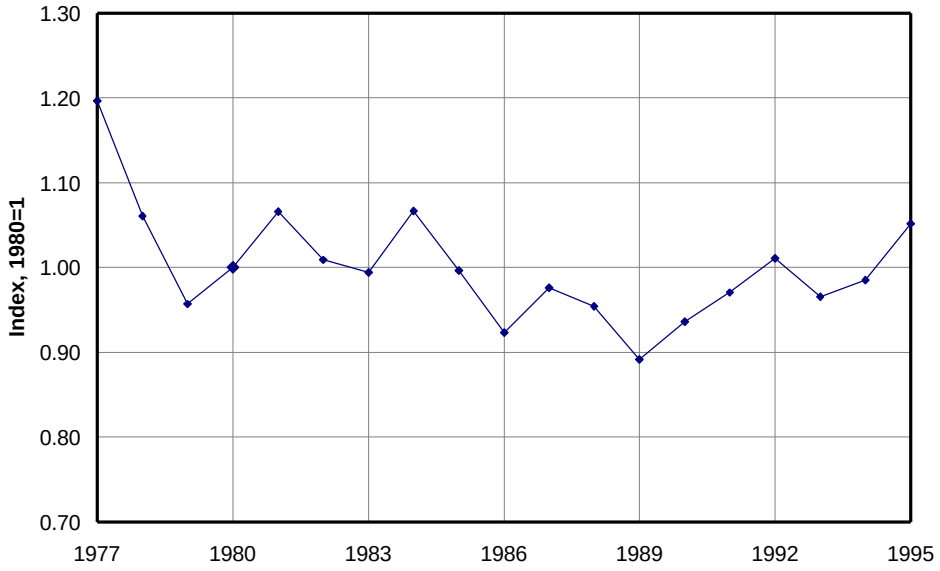
Source: Energy Information Administration

INDUSTRIAL ENERGY CONSUMPTION IN WASHINGTON IS SPLIT FAIRLY EVENLY BETWEEN BIOFUELS, ELECTRICITY, PERTROLEUM AND NATURAL GAS. AS IN OTHER SECTORS, GROWTH IN NATURAL GAS CONSUMPTION HAS ACCELERATED DURING THE 1990S.

Unlike the residential and commercial sectors, which rely primarily on electricity and natural gas, or the transportation sector which consumes almost exclusively petroleum fuels, energy consumption in Washington's industrial sector is quite diversified. Biofuels, electricity, petroleum, and natural gas each accounted for over 20 percent of industrial sector energy consumption during 1995. With the exception of natural gas, the relative market share of each of the fuels has not changed dramatically since 1970. Natural gas consumption declined precipitously between 1973 and 1983, but growth has accelerated in recent years. Industrial natural gas consumption grew 4.2 percent between 1985 and 1990, and 7.2 percent between 1990 and 1995.

15. Industrial Sector Trends — Industrial Sector Energy Intensity

Industrial Sector Energy Consumption per $ of Sector GSP

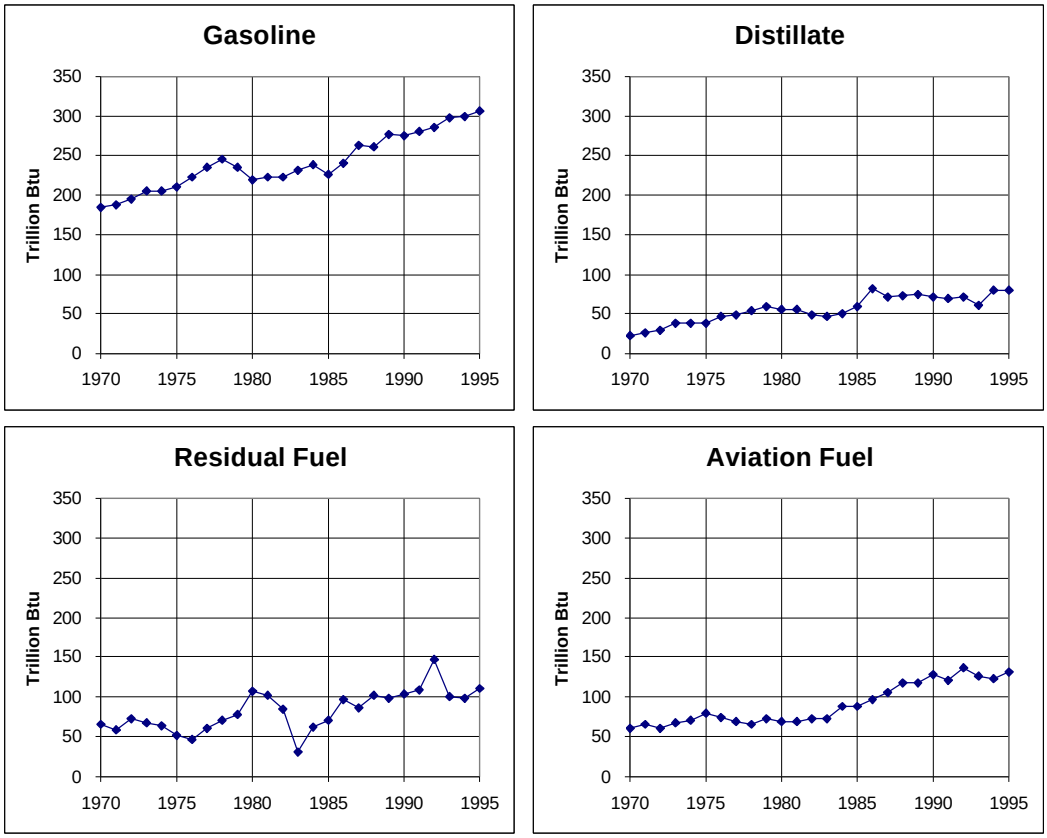


Sources: Energy Information Administration, Bureau of Economic Analysis

ENERGY INTENSITY IN WASHINGTON'S INDUSTRIAL SECTOR EXHIBITS LITTLE LONG-TERM TREND.

Unlike other sectors, Washington's industrial sector does not appear to have become less energy intensive during the last two decades. While natural gas use grew by 74 percent between 1980 and 1995, consumption of electricity, petroleum and biofuels showed little indication of any long-term trend. Both energy consumption and industrial production are extremely volatile, making it difficult to discern underlying trends. Industrial production contracted 15 percent between 1979 and 1985, then grew by 35 percent between 1985 and 1990 before leveling off at approximately $30 billion per year in constant, 1992 dollars. Energy consumption in the industrial sector can vary by as much as 10 percent from one year to the next.

16. Transportation Sector Trends — End-Use Energy Consumption by Fuel



Source: Energy Information Administration

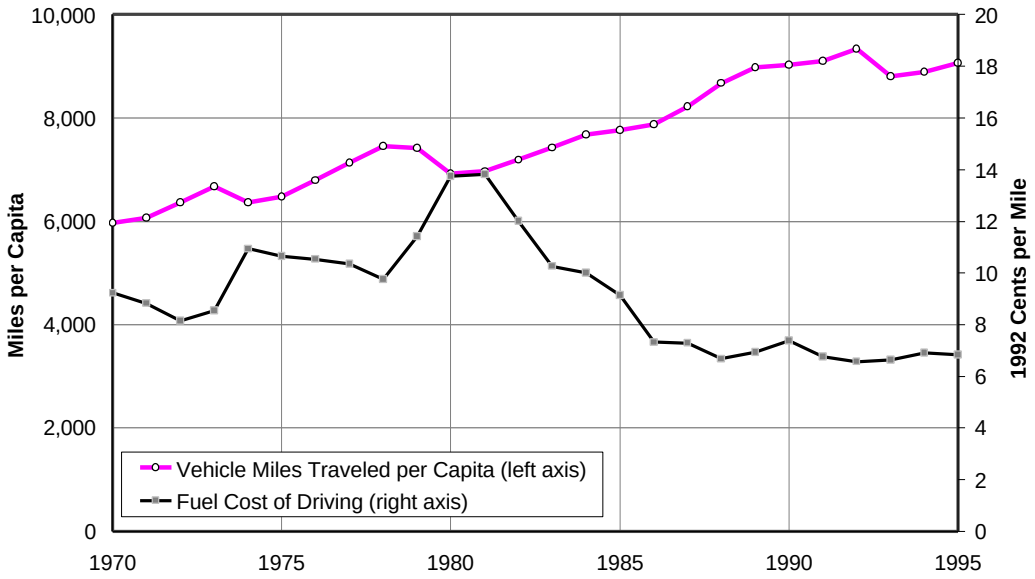
GASOLINE ACCOUNTS FOR HALF OF TRANSPORTATION SECTOR ENERGY USE IN WASHINGTON. WHILE WASHINGTONIANS DRIVE MORE THAN OTHER AMERICANS, WASHINGTON'S STATUS AS A MAJOR SEAPORT AND AVIATION HUB MEANS HIGHER CONSUMPTION OF AVIATION AND MARINE FUELS AS WELL.

Motor gasoline is the dominant transportation fuel, accounting for approximately half of Washington's transportation energy consumption. Except for the period between 1978 and 1986, demand for travel has outstripped gains in vehicle fuel efficiency, leading to steady growth in gasoline consumption. Consumption of motor fuels in boats and ships, airplanes, and railroads has shown growth paralleling that of on-road uses. Residual fuel, used for vessel bunkering, is subject to price-induced volatility, because it can be stored for long periods of time without degrading, leading to large swings in sales during times of high or low prices.

Jet fuel consumption most closely resembles the overall transportation trends. Declining jet fuel prices have contributed to a significant increase in air travel, overwhelming efficiency improvements in the stock of private, commercial, and military planes. Jet fuel use more than doubled between 1970 and 1995, growing at an average annual rate of 3.2 percent.

17. Transportation Sector Trends — Fuel Cost of Driving and Miles Driven

Fuel Cost of Driving and Miles Driven per Capita



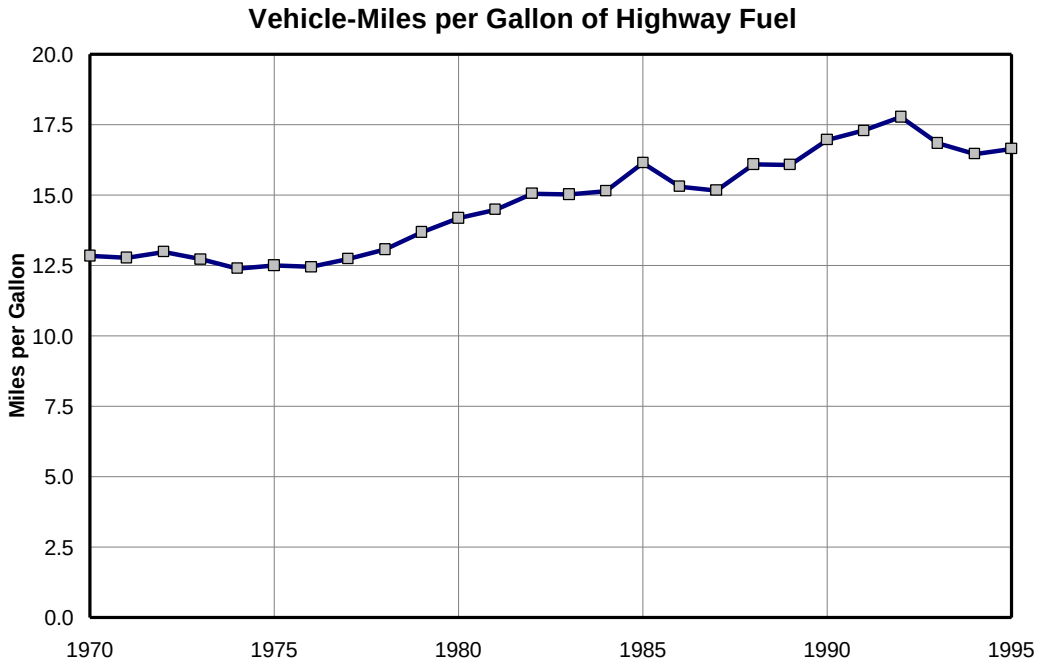
Sources: Energy Information Administration, Bureau of the Census, Federal Highway Administration

WASHINGTONIANS DROVE 50 PERCENT MORE MILES PER CAPITA IN 1995 THAN THEY DID IN 1970. A BIG REASON IS THE FUEL COST OF DRIVING, WHICH REMAINS AT HISTORIC LOWS.

This indicator juxtaposes the fuel cost of driving with miles per driven per capita in Washington. Not surprisingly, these series exhibit a strong inverse relationship. The fuel cost of driving, calculated as real dollar highway energy expenditures divided by vehicle-miles traveled (VMT), spiked upward in 1974 and 1979-1980 as a result of the oil shocks. VMT per capita dropped slightly in response to higher prices, as people temporarily curtailed unnecessary driving. However, long-term factors such as land-use patterns, commuting habits, and the long lifetimes of vehicles mean that large swings in fuel prices lead to only small changes in miles driven.

Increasing sales of more fuel-efficient vehicles in the early 1980s combined with declines in the price of highway fuels to cause a rapid drop in the fuel cost of driving, from a high of 13.8¢ per mile in 1981 to 7.3¢ in 1986 (in 1992 dollars). Gains in fuel efficiency since the early 1970s made this the lowest value in history. However, real gasoline prices have changed little since 1986, and increases in vehicle fuel efficiency have slowed dramatically as well. Meanwhile, vehicle travel increased steadily before falling off in 1993.

18. Transportation Sector Trends — Transportation Sector Energy Intensity



Sources: Energy Information Administration, Federal Highway Administration

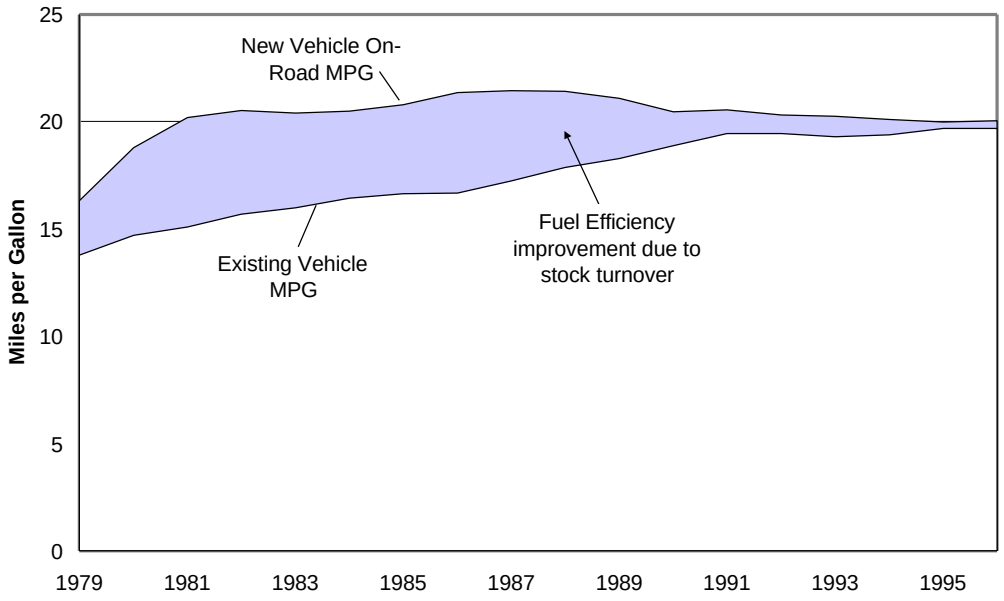
Data Note: Includes heavy-duty trucks.

SPURRED BY HIGH GASOLINE PRICES, VEHICLE FUEL EFFICIENCY INCREASED BY MORE THAN A THIRD BETWEEN 1975 AND 1985. INCREASING POPULARITY OF VANS, TRUCKS, AND SPORT UTILITY VEHICLES IN THE 1990S MAY HAVE PUT AN END TO THAT TREND.

Like other sectors, Washington's transportation sector has become more energy efficient over the years. The average efficiency of Washington's vehicle fleet grew from 12.5 miles per gallon in 1975 to 14.2 MPG in 1980 and 17.0 MPG in 1990. However, fifteen years of improvements in vehicle fuel efficiency appear to have come to an end in the 1990s. In fact, fuel efficiency for new vehicles has declined since the mid-1980s, when federal fuel standards were last tightened. The primary reason is the increasing popularity of minivans, pickups, and sport-utility vehicles.

19. Transportation Sector Trends — U.S. Vehicle Fuel Efficiency

U.S. Vehicle Fuel Efficiency Trends, 1979-1996



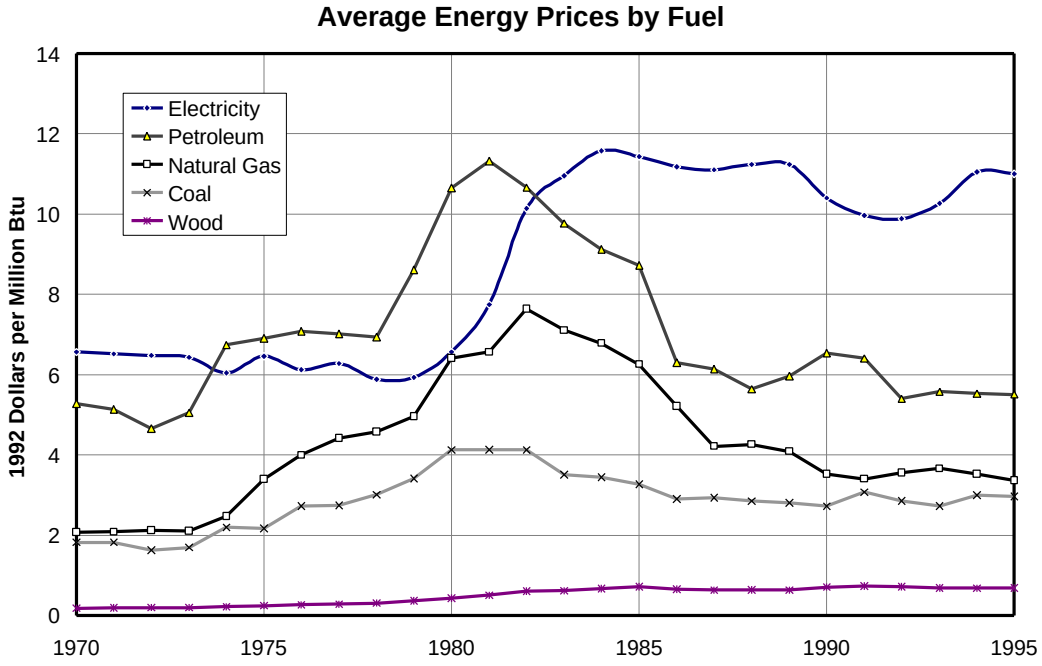
Source:s Energy Information Administration, Oak Ridge National Laboratory

THE FUEL EFFICIENCY ADVANTAGE OF NEW VEHICLES RELATIVE TO THE EXISTING VEHICLE FLEET IS DISAPPEARING. INCREASING POPULARITY OF LARGER VEHICLES, COMBINED WITH THE AGING OF 1980S-ERA SUBCOMPACTS, MAY MEAN AN END TO YEARS OF FUEL EFFICIENCY IMPROVEMENTS.

The difference between the fuel efficiency of new vehicles and that of the nation's existing vehicle fleet continues to shrink and may even have disappeared. New vehicle fuel efficiency has been declining since the mid-1980s, when Congress last increased Corporate Average Fuel Economy (CAFE) standards. CAFE standards require companies to maintain the average fuel efficiency of new vehicles at around 28 MPG for cars and 21 MPG for light trucks (which includes minivans, pickups, and sport-utility vehicles).[4] However, CAFE has no mandates about how many vehicles may be sold in each category, and the increasing popularity of light trucks has caused the fuel efficiency of the average new vehicle to drop by two miles per gallon since 1988.

Moreover, the vehicles being replaced are no longer 1970s-era gas guzzlers, but are frequently compact, fuel-efficient, cars of the 1980s. The result is that, unlike in other sectors where newer equipment tends to be more energy efficient, vehicle stock turnover may be leading to a less efficient national fleet. With the average lifetime of light-duty vehicles being more than seven years and no end in sight to increasing demand for travel, Washington petroleum consumption will continue to increase for some years.

20. Energy Price Trends — Average Energy Prices by Fuel



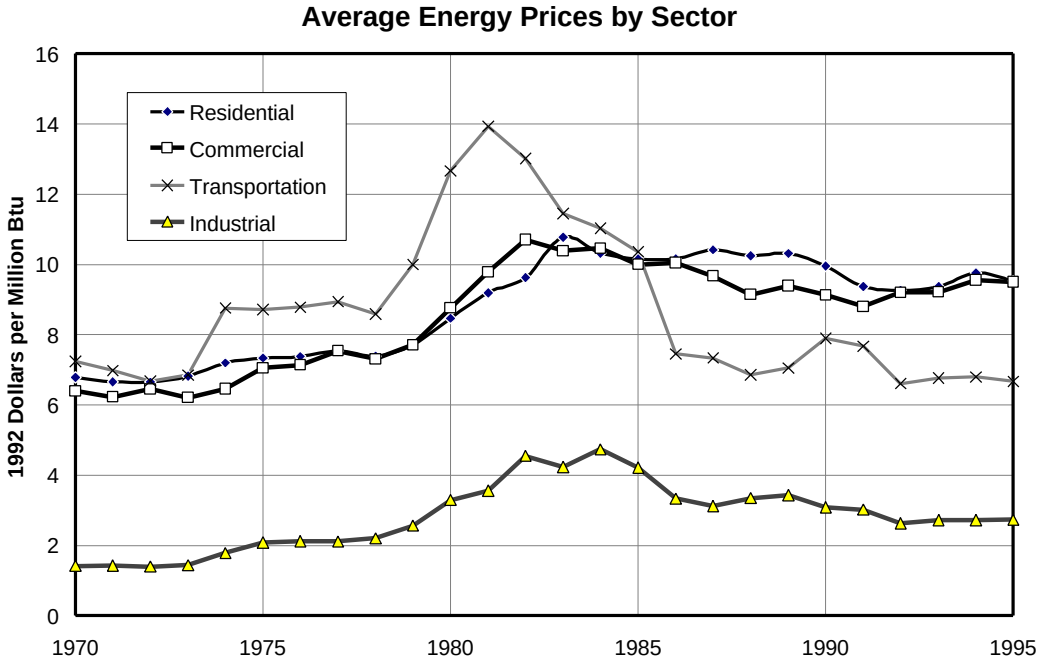
Source: Energy Information Administration

EVEN THOUGH ELECTRICITY PRICES IN WASHINGTON TEND TO BE LOWER THAN IN OTHER PARTS OF THE COUNTRY, ELECTRICITY IS STILL THE MOST EXPENSIVE ENERGY SOURCE. REAL FOSSIL FUEL PRICES HAVE DECLINED SIGNIFICANTLY SINCE THE EARLY 1980'S, BUT AVERAGE ELECTRICITY PRICES HAVE REMAINED CONSTANT.

While the effect of the oil shocks of 1973 and 1978 on Washington energy prices was dramatic, it was relatively short-lived. Petroleum prices increased by 50 percent in 1974, increased by another 63 percent between 1978 and 1981, and then quickly settled back to pre-1973 levels. Real natural gas prices have followed a similar trend, rising steeply during the 1970s, falling during the 1980s, and staying relatively stable in the 1990s. The average price of electricity, which had been low and stable for years, increased by 95 percent between 1979 and 1984 as the costs of new, large power plants, some of which were never completed, were incorporated into electric utility rates. In contrast to oil prices, real electricity prices have not declined from the level they reached during the early 1980s.

The price increases for all fuels caused real Washington energy expenditures to climb by 56 percent between 1978 and 1982. Expenditures were 25 percent lower by 1986 as the price of fossil fuels plummeted, but have since climbed back near the levels of the early 1980s, as energy consumption has increased.

21. Energy Price Trends — Average Energy Prices by Sector



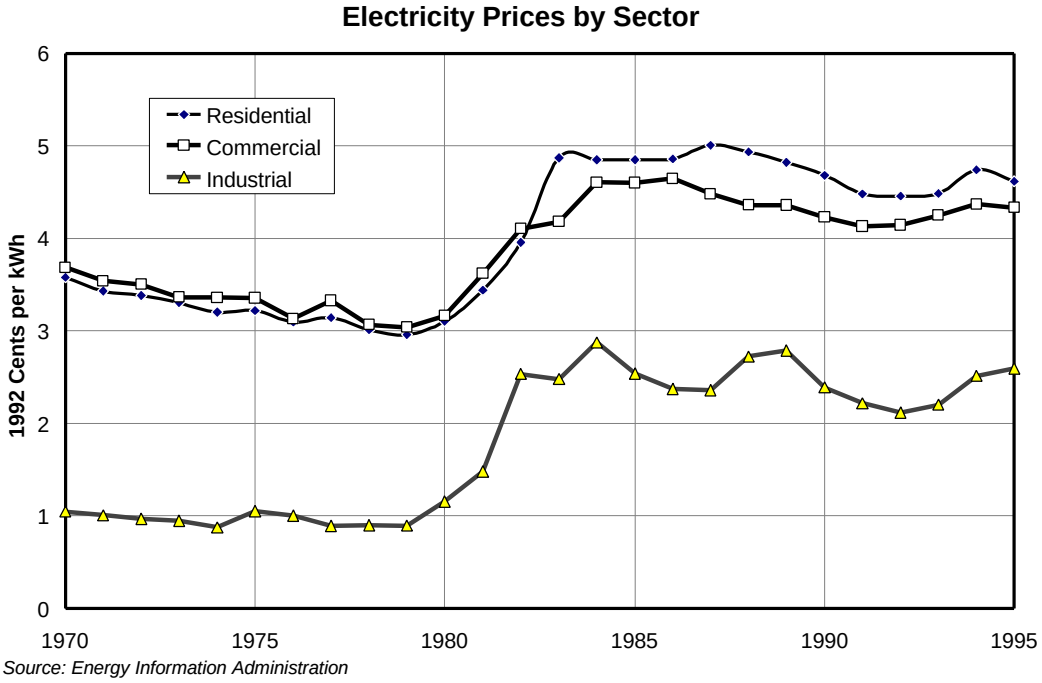
Source: Energy Information Administration

AVERAGE ENERGY PRICE TRENDS BY SECTOR IN WASHINGTON REFLECT THE MIX OF FUELS USED IN EACH SECTOR: ELECTRICITY AND NATURAL GAS IN COMMERCIAL AND RESIDENTIAL BUILDINGS, PETROLEUM FOR TRANSPORTATION AND A MIX OF LOWER COST FUELS IN THE INDUSTRIAL SECTOR.

As in the rest of the country, average energy prices in Washington peaked in the early 1980s and have since declined steadily. The trends have been similar, but not uniform across end-use sectors. The industrial sector bore the brunt of increasing energy prices in the 1970s, but has enjoyed a 35 percent decrease in real energy prices since 1985. Residential and commercial sector prices increased less in relative terms in the 1970s, but have since fallen only slowly. The prices of transportation fuels peaked in 1982 and have fallen steadily since.

The price trends depicted are mainly a function of the fuels used in each sector. The fuel mix has been similar for the residential and commercial sectors since 1970, accounting for the almost identical price trends. Industrial energy prices are lower for several reasons: the sector is much less reliant on electricity, which is expensive relative to other fuels; inexpensive biofuels account for 20 percent of industrial energy consumption in Washington (but only 3 percent of energy expenditures); and larger customers tend to pay a lower price for each fuel. Transportation fuels are almost exclusively petroleum-based — prices in this sector rise and fall with the global price of crude oil.

22. Energy Price Trends — Average Electricity Prices by Sector



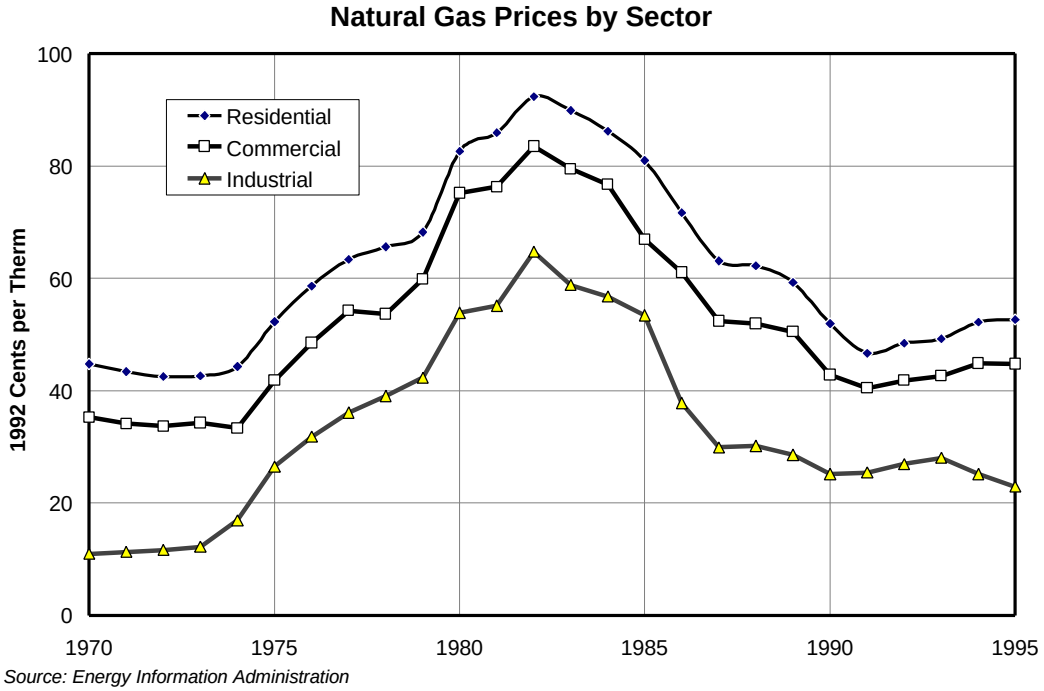
Source: Energy Information Administration

REAL ELECTRICITY PRICES INCREASED DRAMATICALLY BETWEEN 1979 AND 1984. THE MAGNITUDE OF THE INCREASE WAS SIMILAR FOR ALL SECTORS, BUT THE RELATIVE INCREASE WAS MUCH HIGHER FOR THE INDUSTRIAL SECTOR.

The most notable phases in electricity prices are the long, slow decline of prices in the 1970s, the rapid increase between 1979 and 1984, and the period since 1984 when no trend is evident. Price trends for the residential and commercial sectors are nearly identical. Industrial sector prices have been more volatile than residential and commercial prices, increasing over 200 percent between 1979 and 1984, versus 50-60 percent for the residential and commercial sectors. On a per unit basis, however, the increases were similar for all sectors : 1.9¢ per kWh for the residential sector, 1.6¢ per kWh for the commercial sector, and 2.0¢ per kWh for the industrial sector.

Industrial prices have fluctuated as much as half a cent per kWh from year to year during the 1980s and 1990s. This may have as much to do with world aluminum prices as it does with Northwest electricity prices. Aluminum smelters, which account for nearly half of industrial sector energy consumption in Washington, paid electricity prices contractually linked to aluminum prices for much of the time period depicted.

23. Energy Price Trends — Average Natural Gas Prices by Sector



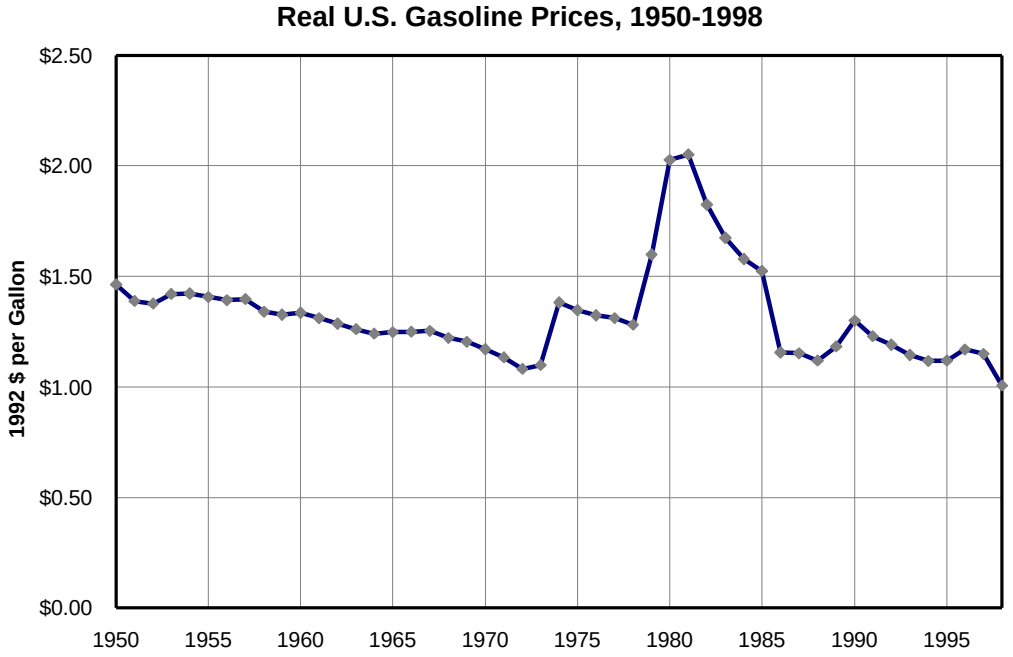
Source: Energy Information Administration

NATURAL GAS PRICES INCREASED RAPIDLY FOR ALL SECTORS BETWEEN 1974 AND 1982 AND DECLINED JUST AS RAPIDLY FROM 1982 TO 1991. INDUSTRIAL SECTOR GAS PRICES HAVE DECLINED SINCE 1993, WHILE RESIDENTIAL AND COMMERCIAL RATES HAVE SEEN MODEST INCREASES.

Price trends for natural gas have been much more uniform across sectors than for electricity. For all sectors, real prices were stable in the early 1970s, increased rapidly between 1974 and 1982, and declined just as rapidly between 1982 and 1991. As with electricity, the price increases during the 1970s were of similar magnitude in all sectors on a per unit basis, but were much larger in percentage terms for the industrial sector. Real natural gas prices increased by approximately 50¢ per therm for all sectors between 1973 and 1982.

Price trends have diverged since 1993. Residential and commercial customers have seen price increases of 7 percent and 5 percent, respectively, between 1993 and 1995. Average industrial sector natural gas prices declined by 18 percent over the same time period. Many large industrial customers have begun to make bulk purchases of commodity gas from suppliers other than their local utilities.

24. Energy Price Trends — U.S. Gasoline Prices since 1950



Source: Energy Information Administration's Annual Energy Review

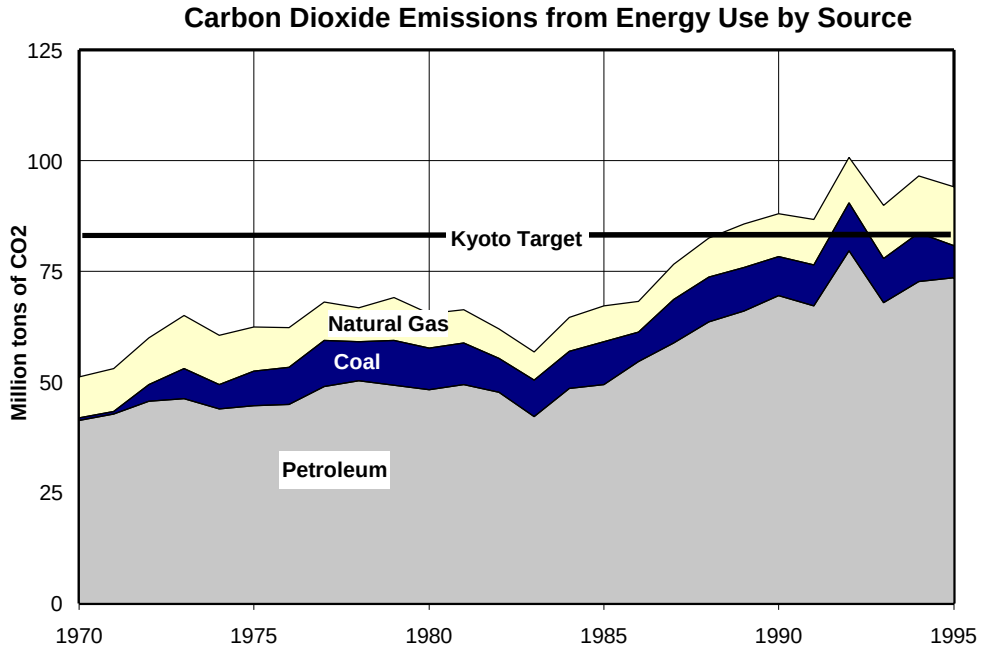
Data Note: 1998 value is an estimate based on data for January-October.

ADJUSTED FOR INFLATION, GASOLINE COSTS LESS TODAY THAN AT ANY TIME IN HISTORY. EXCEPT FOR A PERIOD OF PRICE INCREASES ASSOCIATED WITH THE OIL SHOCKS OF THE 1970S, THE LONG-TERM TREND IN GASOLINE PRICES HAS BEEN A SLOW AND STEADY DECLINE.

In the spring of 1996, U.S. gasoline prices surged from less than $1.20 per gallon in February to $1.40 by May, attracting a great deal of attention from consumers, the media, and even Congress.[5] Two years later, it is apparent that this was a minor departure from a long-running trend of declining gasoline prices. Gasoline prices in 1998 were the lowest on record.

Except for the brief period of OPEC unity, which lasted from 1973-1985, gasoline prices have declined slowly and steadily since 1950 as new fields have been discovered and improved technology, and infrastructure have reduced the cost of extracting, transporting, and refining crude oil. Prices plunged when the OPEC agreements fell apart in 1985, and despite minor blips caused by the Iraqi invasion of Kuwait in 1990 and the unusual events of the spring of 1996, the 1990s have once again seen falling gasoline prices. Adjusted for inflation to 1992 dollars, a gallon of gasoline cost $2.03 in 1980, $1.17 in 1970, and $1.46 in 1950, as compared to $1.00 through the first ten months of 1998.

25. Environmental Trends — Energy-Related Greenhouse Gas Emissions



Sources: Energy Information Administration, Kyoto Protocol

WASHINGTON'S INCREASING RELIANCE ON FOSSIL FUELS HAS LED TO STEADY GROWTH IN EMISSIONS OF CARBON DIOXIDE, THE PRINCIPAL GREENHOUSE GAS. PETROLEUM USE, PRIMARILY FOR TRANSPORTATION, ACCOUNTS FOR OVER 75 PERCENT OF CO_2 EMISSIONS IN WASHINGTON.

Washington's continued dependence on fossil fuels for energy, particularly petroleum, has led to rapid growth in emissions of carbon dioxide (CO_2), the principal "greenhouse gas" contributing to global climate change.[6] After dipping in the early 1980s, growth in carbon dioxide emissions accelerated after 1983 as the economy recovered from recession and oil prices plummeted. Washington's CO_2 emissions grew by 3.4 percent per year between 1985 and 1995.

Consumption of petroleum products, the vast majority for transportation, accounts for over three-quarters of Washington's CO_2 emissions. Emissions from coal are almost entirely from one source, the Centralia Steam Plant which burns coal to produce electricity. Emissions from this source declined sharply in 1995, as the plant was kept idle during much of the year due to low electricity prices. Natural gas contains less carbon per unit of energy than other fossil fuels, but still accounts for a larger share of Washington's CO_2 emissions than coal.

Also depicted is the emission target agreed to during the Kyoto negotiations in 1997, which is 7 percent below 1990 levels. Meeting this target would require a 15 percent reduction from Washington's 1995 emissions level.

Notes

[1] The difference between primary and end-use energy consumption is the treatment of electricity. Electricity must be generated using energy sources such as coal, natural gas, or falling water. These *inputs* to the power plant are counted as primary energy; the *output* of the power plant that is sold to homes and businesses is end-use electricity. Since two-thirds of the energy inputs to thermal power plants are typically lost as waste heat, primary energy is larger than end-use.

[2] The U.S. portion of the Northwest Power Pool includes Washington, Oregon, Idaho, Utah, northern Nevada and the parts of Montana and Wyoming that are part of the Western Interconnection.

[3] The Western Interconnection refers to the geographical area encompassed by the interconnected western transmission grid. It includes all or most of Washington, Oregon, Idaho, Montana, Wyoming, Utah, Nevada, Colorado, New Mexico, Arizona, California, the Canadian provinces of British Columbia and Alberta, and the Mexican state of Baja California Norté. It also includes small portions of Texas, Nebraska, and South Dakota.

[4] Official, EPA-rated fuel efficiency. The Energy Information Administration estimates actual, on-road performance to be 17.5 percent worse than the EPA rating (EIA, *National Energy Modeling System*, Fuel Economy Degradation Factor). This means that new vehicles sold in 1996 can expect to average 20.0 miles per gallon, as opposed to 24.3 estimated by EPA. This is very close to the average, on-road fuel efficiency of the nation's existing stock of light-duty vehicles, which is estimated to be 19.7 MPG (Oak Ridge National Laboratory, *Transportation Energy Data Book*).

[5] For a discussion of the 1996 gasoline price increases, see the May 24, 1996 letter from Washington State Energy Office Director Judith Merchant to Governor Mike Lowry at http://www.energy.cted.wa.gov/LETTERS/960524.htm .

[6] Technical note: These estimates include emissions of greenhouse gases due to the use of petroleum coke as a reactant in industry, which is arguably not "energy-related". However, there are some additional energy-related emissions of greenhouse gases not due to the combustion of fuels that are not included in this indicator. These include releases of methane (CH_4) from coal mining and natural gas pipeline leakage and nitrous oxide (N_2O) released from catalytic converters used on light duty automobiles. These emissions accounted for about 6 percent of Washington's total, energy-related greenhouse gas emissions in 1995.

Section 2: Executive Summary of Washington State Electric System Study (ESSB 6560)

The Washington State Electric System Study (ESSB 6560) report was prepared by the Washington Utilities and Transportation Commission (UTC) and the Department of Community, Trade and Economic Development (CTED) under the provisions of ESSB 6560. The report provides information about Washington's electric utility industry, identifies trends affecting the industry and consumers, and identifies strategies for achieving policy objectives. It does not provide recommendations or reach conclusions as to the advisability of the changes described or the strategies discussed. The report is organized into nine sections.

I. Washington's Electricity Landscape

Washington's electric power system is unique. The state relies heavily on hydropower and federally owned generation and transmission facilities. The majority of retail electricity service is provided by consumer-owned utilities, with only about one third of retail sales accounted for by investor-owned utilities regulated by the UTC. No utilities are granted exclusive territorial franchises in Washington. In contrast, most of the nation is served by fossil-fired generation delivered over investor-owned transmission lines. Retail service is dominated by investor-owned utilities regulated by the states. Most other states grant monopoly franchise service territories.

Average electricity rates in Washington are 4.19 cents/kWh, 40 percent below the national average. While rates vary across the state's 60 or more utilities, even the most expensive of Washington's utilities fall below the national average. Rates in the residential and commercial sectors have increased over the last nine years, but at a pace substantially less than inflation. Some industrial customers, particularly those choosing non-traditional services that involve market-based pricing have seen rate decreases over the last three years, while residential and commercial rates have generally been flat.

Utilities surveyed for the report serve approximately 90 percent of Washington's electricity customers. Among these customers, fewer than 1,000 consume more than one average megawatt of electricity per year or have an annual peak demand greater than one megawatt. Less than one percent of customers have time of use electric meters.

Review of costs by category (generation, transmission, and distribution) suggests that the major reason for Washington's low electric rates is low-cost generation supplies. These relatively low-cost supplies are due to a variety of factors, including the Federal Columbia River Power System (FCRPS), the prevalence of hydropower generally, and the age and ownership characteristics of resources used to serve Washington consumers.

II. Trends Affecting Electric Service Costs

Trends are described in six categories: wholesale markets, retail markets, supply adequacy and reliability, environment, technology, and fuel cost.

Federal policy changes, including the Energy Policy Act of 1992 and subsequent Federal Energy Regulatory Commission (FERC) orders 888 and 889, are transforming wholesale power markets. Active short-term power markets have developed. These markets may reduce costs by increasing use of low-priced resources. They also exhibit volatility and may increase some environmental costs. Increasing wholesale competition may increase pressures to distribute the benefits of low-cost federal power more broadly.

All 50 states have at least examined the prospect of restructuring their retail markets, and mandatory retail competition is underway in at least 13 states. In Washington, utilities have experimented with pilot retail access programs and most offer some form of market-based rates to large customers. Many utilities are involved in corporate realignments and new partnerships. Uncertainty regarding future retail market structure seems to have shortened planning horizons and led to reduced investment in energy efficiency, renewable resources, and resource development generally. This uncertainty makes it unclear who can or should take actions to reduce the growing likelihood of supply and capacity shortages.

Declining salmon populations, global climate change, and increasing competition in electric power markets are trends that may affect the environmental cost of electricity production. At least in the case of declining salmon runs, more environmental costs are being “internalized’ in power rates, reflecting the cost of salmon recovery measures. Internalization of environmental costs does not necessarily increase or decrease total costs, but it does increase prices. These price impacts may be offset by reduced environmental costs.

Improvements in the efficiency of electricity-generating and electricity-using technologies have reduced electric service costs. Renewable technologies and “distributed” technologies such as fuel cells may reduce the cost and change the nature of electric service in the future. New communication and information technologies may present significant opportunities to reduce electric service costs and expand product and service diversity.

Coal and gas prices have generally declined since the early 1980s, though gas prices have climbed since 1995. The cost of these fuels in Washington is below national averages.

III. Strategies to Minimize Electric Service Costs

Strategies to minimize electric service costs are grouped in the same categories as trends affecting electric service costs: wholesale market, retail market, supply adequacy and reliability, environment, technology, and fuel cost. Stakeholder comments on the first draft of this report revealed a tension between maintaining desirable characteristics of the existing system and a desire to respond to changes in the market that may render existing policies and strategies ineffective. Discussion of strategies does not imply that any change is recommended or endorsed.

The wholesale market is not under state jurisdiction. However, actions taken within the state and region may help to minimize the cost of wholesale power. Potential strategies to minimize wholesale power costs include reinforcing the connection between Washington consumers and the benefits of the FCRPS and promoting more effective wholesale competition through more efficient operation of the high voltage transmission grid.

ESSB 6560 did not call for a comparison of alternative retail market structures, and the evidence concerning the effects of market structure on costs is inconclusive. Some strategies may help minimize costs in the presence of competitive pressure by: 1) reinforcing the connection between Washington customers and low-cost resources; 2) mitigating incentives to either shift or increase total costs; and 3) removing barriers to efficient market operation.

The likelihood of supply and capacity shortages in the Northwest in the winter is growing. These shortages may occur under adverse hydropower conditions, due to power demands that exceed the region's combined capability to generate and import power. The prospect of shortfalls is exacerbated by market uncertainty. Utilities may be increasingly reluctant to develop and execute plans to meet future loads reliably when those loads may be served by other power suppliers. Other resource developers may also face obstacles associated with uncertainty. Potential strategies to reduce environmental costs of electric service are described in three categories: salmon recovery, global climate change, and aligning competitive markets with environmental objectives. "Internalizing" environmental costs in energy prices may decrease or increase total costs, depending on whether the value of the resulting environmental improvement exceeds the cost of the measures undertaken. Some strategies, including cost-effective energy efficiency, may reduce both economic costs and environmental costs of electric service.

New and developing energy technologies hold significant promise for reducing electric service costs. Private firms, the federal Department of Energy, universities, national laboratories, and other research institutions are typically the leaders in energy technology development. However, the state can play a supporting role through policy initiatives and technology development

partnerships. Periodic technology assessments may help to identify needs and opportunities.

Fuel costs are generally outside of the state's control. However, strategies discussed elsewhere in the report may affect the state's exposure to changes in fuel costs.

IV. Electricity Rates and Equity: the Potential for Cost-shifting

Electricity rates in Washington are generally set by state or local regulators. These rates are based on an analysis of "cost of service" and regulators' assessments of fairness. For the limited purposes of this analysis, "cost shifts" are defined as decisions by rate regulators to change the distribution of costs. Changing political, regulatory, and market conditions can affect the way state and local regulators make these judgments.

Much of the power generation that serves Washington customers is likely to cost less than its market value. If the value of these low-cost resources is not preserved for Washington customers, power costs could rise significantly. Such an increase could put great pressure on state and local rate-setters to shift costs among customers and customer classes.

Changes in transmission regulation and in the way Bonneville Power Administration (BPA) markets power may influence the probability of cost shifts in the wholesale market. Small rural utilities and residential and small farm customers of investor owned utilities may be particularly exposed to these cost shifts. Strategies to discourage cost shifts in this sector focus on efforts to influence the decisions of the Federal Energy Regulatory Commission and BPA.

Cost shifts may also develop because of changes in retail electricity markets. By gaining access to market-based rates, some customers could leave behind power costs that local or state regulators may shift to other customers. Analysis in this report estimates the potential magnitude of such cost shifts under a range of market price forecasts and other assumptions. Under medium market forecasts, the estimated statewide average potential for cost shifts to the residential and commercial classes is estimated to be 1 to 2 percent of retail rates. Estimates for individual utilities range from 0 to 5 percent. The potential is greater under low market price scenarios.

Cost shifts could also result from utility system "bypass ' - construction of generation or delivery facilities to serve large customers directly. Across a range of market price forecasts, the statewide average potential for cost shifts due to bypass varies from 0.6 percent to 1.2 percent on retail rates of remaining customers. Estimates for individual utilities range from 0 to 3.4 percent.

A substantial proportion of industrial and large commercial load is already being served under "non-traditional" and market-priced tariffs. The average rate for this

service is substantially lower than traditional industrial tariffs. There is no evidence that commercial and residential rates have increased as a result of these discounts. We do not know whether or how the benefits of lower-priced power would be distributed among customers in the absence of these tariffs.

A number of additional circumstances in the retail market could lead to cost shifts including: insufficient metering accuracy for competitive retail loads, unequal collection of funds for system benefit programs, avoidance of state and local revenue taxes, and technology change in "distributed generation" such as fuel cells, micro turbines, and some renewable resources.

A wide variety of both market structure and administrative strategies are available to discourage or prevent the occurrence of cost shifts. Perhaps the most important of these is preservation of the value of low-cost generation resources for Washington customers. Additional structural strategies include clarification of service territory obligations and boundaries, and establishment of competitive retail customer classes, including clear terms and conditions for this service. Administrative strategies address rate setting by state or local utility regulators. These strategies include rate-freezes, rate caps, performance-based rates, clarification of stranded-cost issues, and clarification of system benefit program charges.

V. Utility Service Territory Agreements

Unlike most states, Washington does not issue state level franchises or certificates to provide electric service. While they may need local permits to construct facilities, most electric providers may serve any customer in the state, regardless of their historic service territory. Providers are allowed by state law to enter into voluntary, contractual service territory agreements that define service territories and obligations. These agreements must be approved by the UTC. Over time there have been 28 such agreements; 17 remain in effect and a number that have formally expired are still being observed.

State law has no provision requiring electric companies to deliver power for other electric providers. However, state law does discourage the construction of duplicate facilities for energy service. Currently, there appears to be little duplication of facilities. However, duplication of facilities may increase, particularly if more customers seek energy supplies from providers other than their traditional distribution utility. State-level certificates could uniformly define the rights and responsibilities of distribution utilities without restricting the ability of new consumer-owned utilities to form. Proponents of establishing state certificates for distribution territories argue such a step could allow increased competition while maintaining the state policy against duplication of facilities. Opponents suggest that exclusive service territories would insulate distribution utilities from competition and decrease pressure to minimize distribution costs.

VI. Consumer Protection Policies and Procedures

The UTC establishes consumer protection rules for investor-owned utilities and local governing boards establish consumer protection rules for consumer-owned utilities. Policies tend to be uniform for investor-owned utilities. There is more variation among consumer-owned utilities, with smaller utilities tending to have more informal means of establishing credit, collecting past due amounts, and handling customer complaints.

All covered utilities have complied with the disclosure requirements of ESSB 6560. The UTC and CTED surveyed utilities on their policies in a number of general categories including: credit and deposit requirements; methods of informing customers of rates and terms of service; metering, billing, and adjustment policies; payment arrangements, such as due dates, late fees, budget plans, and financial assistance; disconnection procedures; confidentiality of customer information; complaint procedures; protections for contract customers; and customer survey methods.

Increased competition may lead to increasing consumer complaints. Additional consumer protection may be needed if competition increases, along with consumer education designed to alert consumers to their new rights and choices. Some issues that may arise include: protecting consumers from fraudulent providers; ensuring adequate disclosure of product information so customers can compare offerings; allocating stranded costs among customers and shareholders; clarification of metering requirements; disconnection policies; protecting against market power abuses; registration and licensing of service providers; and ensuring that basic service remains affordable.

VII. Utility Service Quality

Service quality encompasses items such as customer access to the utility; responsiveness to customers; restoring power after outages; the time required to establish new service or make repairs; and the process for handling customer complaints.

The UTC oversees service quality standards for investor-owned utilities while local governing boards oversee standards for consumer-owned utilities. Rules governing service quality are not uniform or comprehensive. In one case, as a condition of a utility merger, the UTC has developed a detailed service quality index (SQI), establishing targets and monetary sanctions.

Existing and prospective competition may begin to put pressure on service quality performance. Experience in other industries indicates that customers with more competitive choices tend to see improved service quality, while monopoly customers see a decline. A survey of state utilities shows that many do not routinely measure service quality and that the elements that are measured vary

from utility to utility. Lack of common data makes it difficult to draw general conclusions.

If the Legislature decides that minimum service quality standards should be established, it has at least two alternative strategies. It could set general principles and let state and local regulators establish specific standards consistent with the principles. This would allow local decision-making, and would likely lead to more variation in policies. Alternatively, the Legislature could set uniform statewide standards. This would ensure consistency throughout the state, but may not recognize unique local conditions. If retail competition is broadly implemented, the Legislature could establish a service quality "floor," but allow individual companies to provide a higher level of service as a way to compete.

VIII. Electric Service Reliability

Major dimensions of system reliability include power interruption, power quality, and generation supply adequacy. Available survey and engineering data tentatively show that Washington consumers are generally satisfied with the reliability of the electric power system, and that system outage statistics are comparable to national averages.

Most utilities measure power interruptions, though precise methods vary. Equipment failure, trees and branches, animals, and accidents are the cause of most power interruptions. Storms are often the immediate cause of such interruptions.

Power quality refers to the voltage and frequency characteristics of delivered power. While power quality has long been a concern for industries with sophisticated production equipment, it is a growing concern for other business and residential customers because of the proliferation of microprocessors, which are sensitive to power fluctuations.

Reliability also depends on adequate power supply capacity. In our hydroelectric based system, supply varies substantially with precipitation and snow pack. Transmission capacity can affect the ability of utilities to meet peak loads reliably, particularly in Western Washington. With growing competition and uncertainty regarding future market structure, utilities' ability to plan for and invest in adequate power supplies may be impaired. Increasingly, power supply may be provided by independent producers that are not subject to state or local regulation. The ability of these independent entities to deliver power reliably under a range of weather and market conditions is not known.

Competitive pressures and market uncertainty may also affect utility investment in distribution systems, where storm response, system maintenance, system expansion, and vegetation management are keys to reliability. Utilities may also

face pressure to help customers protect themselves from power quality fluctuations and to ensure their systems are Year 2000 (Y2K) compliant.

Additional challenges to system reliability may be found in the transmission system, which handles transfers of bulk power. Historically, the system has been managed by regional utilities that voluntarily comply with industry standards. Increasing competition in wholesale power markets makes voluntary compliance more difficult to maintain. Discussions are taking place at the national and regional levels to develop new models designed to maintain transmission system reliability.

Strategies that address reliability in distribution, generation, and transmission are discussed. Distribution strategies are further categorized into those that involve performance standards, program standards, and institutional and market issues.

IX. Electric System Benefits

State and federal governments have adopted a variety of policies in support of conservation, renewable resources, and low-income service (system benefits). Policy goals underlying these purposes include: minimizing total costs of energy service; ensuring affordable service; environmental quality; affordable housing; efficiency in government and industry; diversification of energy supplies; minimizing waste; and others.

Trends: From 1979 to 1995, the region's utilities acquired over 800 average megawatts of energy savings in cooperation with state and local governments and consumers. The Northwest Power Planning Council estimates that 1500 average megawatts of cost-effective savings are available at an average cost of 1.7 cents per kWh. Capturing these savings would reduce the region's electricity bill by an estimated $1.7 billion. Investment in energy efficiency in Washington has declined from nearly $155 million in 1993 to an estimated $44 million in 1998 and is projected to continue to decline to $24 million in 2000. Competitive pressures to minimize prices, lower wholesale energy prices, uncertainty regarding future market structure, and programmatic changes have contributed to this decline.

Non-hydro renewables represent less than one percent of utility sales in Washington. Declining wholesale power prices and market uncertainty have dampened renewable resource development below what was planned in the early 1990's. Utility-scale wind projects came on line in Oregon and Wyoming in 1998. However, a planned project in southern Washington was cancelled.

Low-income energy services include home weatherization and various forms of assistance in paying bills. While need appears to be increasing, funding for these services has declined, due in large measure to reductions in federal and BPA funding. There are some indications that low-income bill assistance by utilities may be increasing.

Electric system benefits have been accomplished with a mixture of public and private investment. Public investment in these functions has come primarily from electric service revenues and been administered by utilities and BPA. Public investment may be necessary in order to remove market barriers to energy efficiency, or to achieve other policy goals including environmental quality and universal service. Most of the states that are restructuring retail markets have included provisions for funding energy efficiency, renewable resources, low-income services, and/or research and demonstration.

Strategies: Opinions vary widely on how to pay for, administer, and achieve electric system benefits. However, there appears to be relatively broad support for approaches that: encourage rather than replace private investment in these functions; maximize the ratio of achievement to investment; and distribute the costs and benefits of these investments equitably.

Sources of public investment include electric service revenues and tax revenues. Electric service revenues may be collected through a system benefits charge – a competitively neutral charge on delivery of electricity that applies to all consumers. A variety of program approaches and administrative options for public investment in energy efficiency, renewable resources, and low-income services are discussed, with an emphasis on how these approaches can complement and encourage private investment while minimizing costs.

Other strategies for accomplishing these purposes may require little or no direct public investment. These include: improved energy codes and standards; developing markets for green resources; a renewable portfolio standard; internalizing environmental costs through environmental standards or fees; and flexible payment arrangements for low-income customers.

Achievement of electricity system benefits over time may be improved by establishment and tracking of performance objectives, and through periodic review of investment levels and program strategies.

Section 3: Siting and Regulating Major Energy Facilities

I. Background

The Energy Facility Site Evaluation Council (EFSEC or Council) provides a one stop siting process for major energy facilities in Washington. Applicants for energy facility siting receive all of their necessary state and local environmental permits and other licensing terms and conditions from the Council. Once a facility is sited, the Council has a continuing responsibility to monitor the construction and operation of the facility. EFSEC also ensures that effective and coordinated emergency response plans are in place and satisfactorily tested for the WNP-2 nuclear plant.

EFSEC is a Washington State agency comprised of a citizen chair appointed by the Governor and representatives from nine state agencies including: the Military Department, Departments of Natural Resources, Community Trade and Economic Development, Transportation, Fish and Wildlife, Health, Ecology, Agriculture, and the Washington Utilities and Transportation Commission. When an application to site a facility is submitted, the Council is augmented by representatives from particular counties, cities, or port districts potentially affected by the project. Administrative and staff support for EFSEC is provided by the Department of Community, Trade and Economic Development.

The Council's responsibilities derive from the Revised Code of Washington (RCW) Chapter 80.50.

II. Goals

EFSEC activities are organized under three goals:

1. Provide an orderly, systematic procedure for applicants, agencies, and other interested parties involved in siting or expanding large energy facilities: thermal electric power plants above 250 megawatts and their associated facilities; large intrastate natural gas and oil pipelines; oil refineries; and underground natural gas storage facilities.

2. Regulate the construction and operation of major energy facilities to ensure compliance with the conditions of the site certification agreement (license) issued for the life of the project.

3. Ensure that effective and coordinated offsite emergency response programs and plans involving state, local and federal agencies are in place and satisfactorily tested for the WNP-2 nuclear power plant on the Hanford Site.

III. Benefits

The Council centralizes the evaluation and oversight of large energy facilities in a single location within state government. The Council considers a number of factors in determining whether a facility should be approved, approved with modifications, or

denied. As part of the evaluation and review process, protection of environmental quality, safety of energy facilities, and concern for energy availability are all taken into account by the Council. If a project is approved, EFSEC specifies the conditions of construction and operation; issues permits in lieu of any other individual state or local agency authority; and manages an environmental and safety oversight program of project operations to ensure compliance with certification conditions.

The environmental review process coordinated by the Council provides opportunities for public and governmental agency participation through hearings and the review of the application and environmental documents.

One-stop siting provides certainty to applicants that all siting requirements will be managed through a coordinated process. State and federal environmental review processes can be managed cooperatively to include the development of joint environmental impact statements and conducting combined hearings.

By providing a comprehensive environmental review process for major energy facilities, EFSEC helps ensure that new energy facilities are sited with a minimal effect on the environment.

IV. Services

A. Siting New Projects

EFSEC serves potential applicants seeking certification of large energy facilities within Washington. The Council's process provides applicants a fair and timely review of energy facility proposals.

The Council also serves state and local agencies and tribal interests. These groups' customary concerns and responsibilities are addressed during reviews and public hearings under the 'one-stop shopping' provision of EFSEC's statute. During recent application reviews, representatives from ten counties, five cities, and four port districts have become members of the Council to review applications to site three combustion turbine projects and one intrastate oil pipeline.

In addition, EFSEC interacts with numerous federal agencies regarding facility siting, licensing, compliance monitoring, and nuclear emergency planning.

EFSEC also serves members of the public and organizations that may be especially interested in energy facility decisions. The concerns raised by these groups and individuals must be considered during EFSEC's site evaluation process.

Throughout the siting process there are opportunities - via a rigorous schedule of public hearings and environmental study - for interested parties, including governmental agencies, to participate in the review and provide written or oral information on a proposed project.

B. Regulating Certificate Holders

Current site certification agreements are in force for the five nuclear plants owned and operated by the Washington Public Power Supply System (Supply System) - WNP-2 in operation; WNP-1 and -3 in termination status; and WNP-4 and -5 in stages of decommissioning. In addition, active site certification agreements are currently in place for four combustion turbine projects that have not yet been constructed. Council activity will continue to focus on ensuring compliance with certification conditions at WNP-2 to include: 1) protection of state and federal environmental and public health and safety standards; and 2) maintaining a capability for off site agencies to respond in the event of a radiological accident. The Council administers contracts with state and local agencies totaling approximately $2.5 million per biennium to meet its goals for environmental and nuclear safety oversight at WNP-2 and the other Supply System project sites.

The Council also maintains oversight authority for site restoration activities at the four Supply System projects that have been terminated. For the Satsop nuclear project site, legislation adopted in 1996 provides for the transfer of portions of the site to local governments for economic development purposes. The Council is working with the county and state agencies and the Supply System to ensure an orderly transfer of responsibilities to local government.

V. Results

The Council has processed extensions of air emission permits for the three combustion turbine natural gas-fired projects which have EFSEC permits: the 838 Megawatt (MW) Northwest Regional Power Facility (NRPF) in Creston; the 438 MW Satsop Combustion Turbine (CT) Project near Elma; and the 450 MW Chehalis Generation Facility in Chehalis.

Council siting activities are currently focused on processing/reviewing the application filed by the Olympic Pipe Line Company for its proposed Cross Cascade Pipeline Project ñ a 231-mile petroleum products pipeline from Woodinville in King County to Pasco in Franklin County. In May 1998, the Council received sizable amendments to the pipeline application. EFSEC has also completed a state/federal draft Environmental Impact Statement for the proposed pipeline with EFSEC and five federal agencies as cooperating agencies. Adjudicated hearings have been scheduled for the spring of 1999. The Council's review process will have the participation of 14 local government members from counties, cities, and port districts directly affected by the proposed project.

During 1998, the Council undertook to review its rules under Executive Order 97-02. Rules regarding the amendment of Council Site Certification Agreements, termination of agreements, site restoration, and Council enforcement actions are being examined for possible changes or modification.

The Council has initiated discussions aimed at examining the future role of EFSEC and the siting of major energy facilities. Several areas of interest have emerged that merit further examination: relationship between EFSEC and land use consistency

determination; involvement of the Governor in the decision making process; EFSEC staff roles in adjudicative proceedings; better integration of the EFSEC process with provisions of the State Environmental Policy Act; and the role of the energy facility siting function as the electric power industry becomes increasingly competitive.

VI. Challenges

The primary siting challenge currently facing the Council is the processing of the Olympic Cross Cascade Pipeline Project application. The Council anticipates extensive adjudicative proceedings on this project during Fiscal Year 1999 and into the next biennium, with completion of the siting process probably occurring in Fiscal Year 2000.

The Council anticipates one application to site a gas-fired combustion turbine project in fiscal year 1999 and one in fiscal year 2000. With growing competition in the electrical energy arena, and possible deficits of power in the Northwest predicted, EFSEC anticipates additional siting activity in the next four to five years.

The Council's regulatory interests will continue to be directed at ensuring that the WNP-2 nuclear plant is operated safely to ensure protection of the environment and the public health and safety. At the same time, the Council will actively work with the Supply System and local governments to see that restoration and/or transfer requirements are met.

Finally, rapid changes in the electric industry discussed in Section 2 and EFSEC's look at its future may prompt revisiting the scope of EFSEC's jurisdiction and how it examines applications for siting energy facilities. The legislation was enacted in an era where regulated utilities were the sole purchasers of power and were subject to significant regulatory and public oversight on cost control, need for power, and reliability standards. As this structure changes, some argue that there is no longer adequate accountability over decisions to build new transmission or smaller power plants. EFSEC currently has no jurisdiction over the following types of facilities:

- Non-thermal, i.e., wind or solar, generating facilities;
- Generating facilities under 250 MW, an increasingly large component of new power plants;
- New transmission facilities that are not associated with a large-scale generating plant; and
- Large, above-ground natural gas storage facilities for gas that has not been transported over marine waters.

Whether this implies a need for changes to EFSEC's jurisdiction is a matter that may be up for debate before the Legislature in the future. Another concern that has been expressed about the Council's statute is that the preamble language inappropriately establishes that there is "a pressing need for increased energy facilities" in Washington. It has been the Council's experience that the presumption of need language has led to some unnecessary complications in the siting process that could be avoided by more neutral language.

Section 4: The Next Generation of Energy: Renewable Energy and Energy Efficiency Industries in Washington State

For the Energy Division of the Department of Community, Trade, and Economic Development

By
ECONorthwest, Seattle, WA
August 1998

The following is the executive summary of a recent survey and analysis of the renewable energy and energy efficiency industries in our state. The report demonstrates that the industry is an important contributor to the state's economy. The amount economic activity of the renewable and energy efficiency industries in our state is approximately the same as Washington's wholesale apple industry.

Executive Summary

Washington's Clean Energy Industry in Transition

The energy industry is in flux, as growing competition, new technologies for energy production, and rising environmental concerns about greenhouse gases are all contributing to the reshaping of the industry. Within this context of change, the Washington Department of Community, Trade and Economic Development commissioned a study of the state's energy efficiency and renewable energy industries. This report describes Washington's energy efficiency and renewable energy industries and explores how those industries are likely to react to current market conditions and public policies.

Clean Energy Is a Billion-dollar Industry

Together, the energy efficiency and renewable energy industries in Washington State generate yearly sales of nearly $1 billion and employ close to 4,000 people. The energy efficiency industry represents the majority of this revenue and employment.

Energy Efficiency Industry

Washington's energy efficiency industry generates annual sales of about $780 million and employs approximately 2,900 people earning combined annual wages of $128 million. Energy service companies and engineering firms providing a range of energy management services represent the largest component of the efficiency industry with revenues of $431 million and employment of 1,300 people. Other sectors of the energy efficiency industry include companies that design, build, and install energy efficient lighting systems; various controls and other electrical equipment; and heating, ventilating, and air conditioning (HVAC) systems.

This report's estimate of the size of the energy efficiency industry is conservative because it only includes firms that identify themselves as working in the energy efficiency field or that other organizations have previously classified as members of the industry. Many other companies design, build, and install energy efficient equipment and buildings in their normal course of business but do not identify themselves as members of the energy efficiency industry. State energy codes for residential and commercial construction make most companies involved in new construction and equipment replacement effective members of the energy efficiency business, but these companies are generally not included in this industry assessment unless they have specifically identified themselves as energy efficient.

Renewable Energy Industry

Washington's renewable energy industry generates sales of $147 million and employs 900 people earning combined annual wages of over $32 million. The firms that build and design solar energy systems and related electricity storage and conversion equipment comprise the largest component of the renewable energy industry. Solar companies in Washington generate sales of $71 million and employ over 420 people. Other renewable

energy firms include companies that design, build, or operate biomass fuel systems, small-scale hydroelectric facilities, wind energy generators, geothermal energy plants, fuel cells, and electric vehicles.

Challenges and Opportunities for Clean Energy

With increased competition in electricity generation, public and private utilities have spent less on programs for energy efficiency and renewable energy. Moreover, the introduction in recent years of highly efficient gas turbine generators, combined with low natural gas prices, has driven wholesale prices of electricity down to levels where some energy efficiency and renewable energy investments are not cost effective. While these trends present near-term challenges for firms in these industries, interviews with company leaders and other industry experts suggest that the long-term prospects for energy efficiency and renewable energy are brighter.

Several large firms in the renewable energy sector currently have significant markets overseas, and they have excellent opportunities to expand their business in developing countries, particularly in remote locations where their technologies are more cost-effective. Public policy initiatives to reduce greenhouse gases also have the potential to expand the market for energy efficiency and renewable technologies substantially. In addition, several policy initiatives proposed as part of the restructuring of the electricity industry would provide dedicated funding to support energy efficiency and renewable energy programs. The majority of firms interviewed in this study felt that with supportive public policies, their companies had strong potential for future growth.

Section 5: Year 2000 and Electric Utilities

Introduction

The year 2000 problem, or Y2K, is a result of computer and chip programming which uses a two-digit year in date fields that in turn may cause computer disruption before or on January 1, 2000. This problem affects computers, computer applications, and processors embedded in a variety of common devices. It also means that a business' Y2K problems could impact its customers and competitors. A now anonymous person once dubbed electricity the "long pole in the Y2K tent." The reason is simple: if government, businesses, and individuals have electrical power during the transition into the next century, they will be able to deal with their own Year 2000 issues. The North American Electric Reliability Council, in its September 1998 report to the U.S. Department of Energy, perhaps said it best:

> *"So what is so unique about Y2K in the electric industry? First, electricity is the lifeblood of our modern society. United States Senator Robert F. Bennett of Utah, a leading advocate for aggressively attacking the Y2K bug, has rightly noted that the electric industry is the highest priority for maintaining the operations of critical infrastructure.*
> *Without a reliable supply of electricity, the Y2K problems in other industries become secondary, especially if all those computers and electronic devices society depends on every day don't have any electricity to run them. There is no doubt that our North American society has come to expect and fully depend on electric service reliability that meets the highest standards in the world.*
>
> *The second unique aspect of power systems is that electricity is the original and ultimate example of "just-in-time" manufacturing. Electricity cannot be stockpiled in large quantities like other commodities, such as water, gasoline, clothing, and paper. This real-time production requirement greatly increases the complexity of production (generation), transportation (transmission), and delivery (distribution) of electricity. At the instant someone turns on a light or their PC, the additional electricity required must be immediately available from a generating station that may be hundreds of miles away."*

While there are a large number of variables, the general outlook regarding electricity in the Northwest on January 1, 2000, is cautiously optimistic. Much more information with which to assess the region's readiness will be available in the early months of 1999.

To understand the impact of the Year 2000 electric issues on Washington State, it is helpful to understand some background about the utilities in Washington State and the electric system in the western United States.

Electric Utilities in Washington State

Washington State has 64 electric companies that fall into four different categories.

- Investor-owned utilities (IOUs) are private corporations owned by shareholders and regulated by the Utilities and Transportation Commission.

- Public Utility Districts (PUDs) are units of local government, governed by elected officials.
- Municipal utilities are much like PUDs except they are ultimately governed by elected city councils, not separately elected officials.
- Rural Electric Cooperatives (Co-ops) and Mutuals are private corporations owned by customers and regulated by elected commissions.

Appendix A provides a listing of Washington electric utilities, class of ownership, number of customers, revenue, and sales.

The Western Systems Coordinating Council

Eleven utilities that deal in bulk power generation and transmission covering nearly 80% of the electrical sales in Washington State belong to the Western Systems Coordinating Council (WSCC). WSCC is the international organization that promotes electric system reliability in the western United States. WSCC was formed in 1967 and is the largest and most diverse of the nine regional electric reliability councils that comprise the North American Electric Reliability Council (NERC). *See Figure 1.* NERC provides a forum for its members to enhance communication, coordination, and cooperation for planning and operating a reliable interconnected electric system. Membership is voluntary and open to major transmission utilities, transmission dependent utilities, and independent power producers/marketers. Affiliate membership is available for power brokers, environmental organizations, state and federal regulatory agencies, and any organization having an interest in the reliability of interconnected system operation or coordinated planning. WSCC encompasses electric systems serving all or part of 14 western states, British Columbia and Alberta, Canada, and Baja California Norte in Mexico. The regional councils created NERC in 1968 to coordinate the efforts of the regional councils, to set national standards for electric system operation, and to monitor voluntary compliance with those standards.

The WSCC differs from most regional reliability organizations in that it also one of the three regional interconnections in North America. *See Figure 2.* This means that system security problems caused by operations in the WSCC region cannot have any effect on operations outside of the region. It is a fairly isolated system with just six relatively weak links to the eastern interconnection. It also means that the voluntary standards developed by the WSCC are applicable to every party whose action can have a negative impact on WSCC reliability. This stands in contrast to the situation in the eastern interconnection, where rules and standards are developed by seven different regional reliability organizations, and each region is vulnerable to the actions of companies in neighboring regions. The unique situation in the WSCC has resulted in a unique set of institutional relationships in the western interconnection. Solutions to transmission system operational issues have traditionally been devised and implemented on a consensus basis within the western interconnection, with a minimum of oversight from outside parties. The utilities in the WSCC work together constantly and are on a first name basis with each other. WSCC members report their Year 2000 readiness activities to the North American Electric Reliability Council on a quarterly basis.

North American Electric Reliability Council

NERC provided information on electric utility Y2K preparedness in its September 1998 report to the U.S. Department of Energy. Their second report is dated January 11, 1999. NERC believes Y2K impacts on electrical systems may be less than originally anticipated, if mitigation of operating risks and contingency planning are carried out within the industry. Therefore, NERC recommends that electric utilities accelerate the pace of Y2K inventory and assessment so that remediation and testing may be completed by May 31, 1999, and that critical systems and components are Y2K ready by May 31, 1999.

NERC has developed a guide to contingency planning that addresses staffing and operation of the power system on critical Y2K dates. The contingency plans will be implemented by each of the NERC regions, (the WSCC for the Northwest), and Y2K work will be coordinated at interconnection, regional, and organizational levels. In addition to coordination within the electric industry, coordination needs to be stepped up between the industry and external communication providers, suppliers of natural gas and oil, and rail transportation of coal.

NERC's work plan of Y2K activities includes continuing to coordinate with trade associations and regional reliability councils, including establishing compliance deadlines. The council is also urging federal, state, provincial and local government in the U.S., Canada, and Mexico to coordinate efforts with electric utilities.

Challenges to achieving Y2K readiness include:

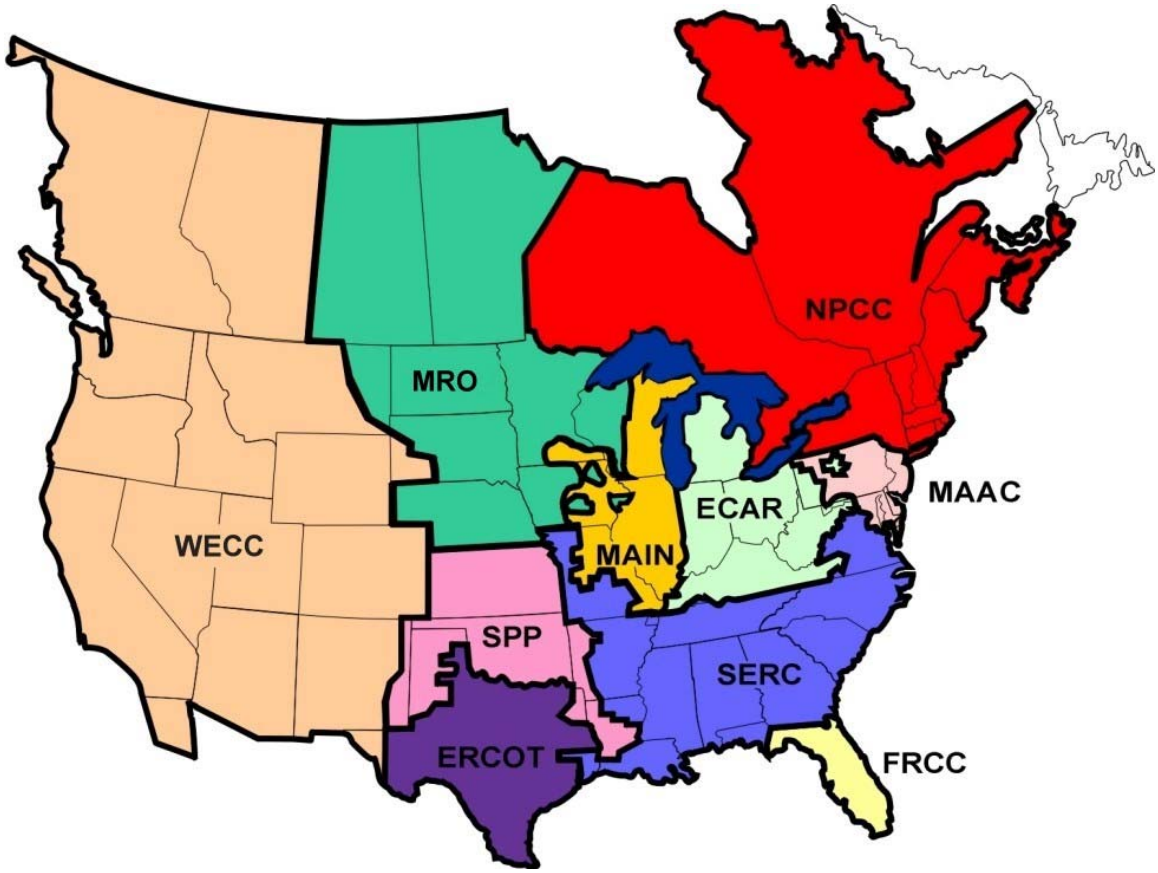
- The sheer amount of complex work remaining.
- The large number of operating systems. Currently, the industry consists of 3,200 organizations, including about 200 operators of bulk electric systems.
- Industry restructuring that introduces wholesale and retail competition for electricity.
- Lack of sharing of technical information on Y2K problems and solutions among system operators and suppliers. The primary concern is the heavy threat of litigation over issues such as due diligence and product defamation.
- Close coordination with related industries, such as telecommunications, railroads, and other energy suppliers.

Because of its over-arching national and regional role with electric organizations, NERC has made the following recommendations to federal, state, and local governments:

- Allow the industry to continue managing Y2K efforts. Government requirements for additional reporting will dilute already strained resources.
- Provide immediate legislation or alternative legal measures to protect the electric industry from litigation related to Y2K information shared in good faith.
- Consider Y2K preparedness in any new regulatory legislation.

- Temporarily suspend aspects of electric market operations during critical Y2K hours or days.
- Temporarily suspend aspects of environmental regulations that restrict or prohibit operation of generating stations when emissions monitoring systems are unavailable.
- Use of nuclear power during Y2K transition periods.

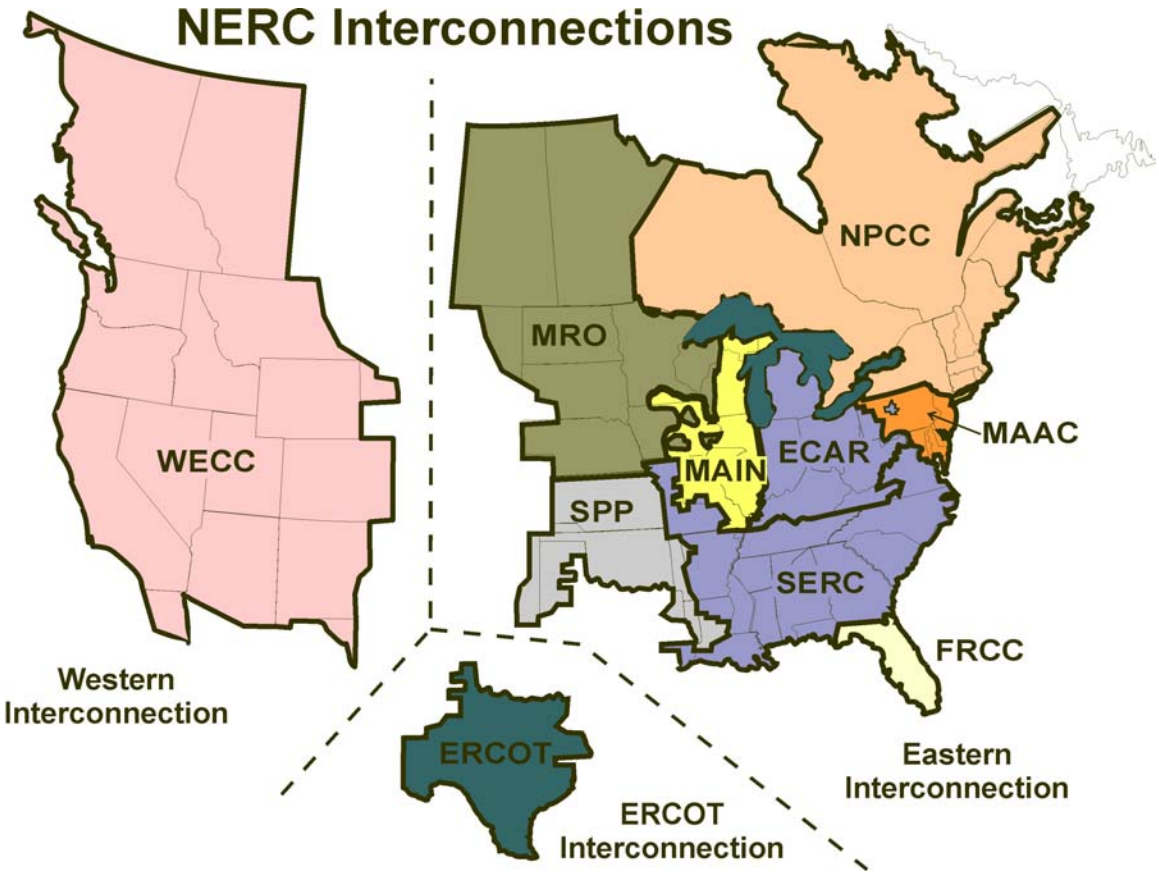
Figure 1. North American Electric Reliability Regional



Regional Councils

ECAR East Central Area Reliability Agreement
FRCC Florida Reliability Coordinating Council
MAIN Mid-America Interconnected Network
NPCC Northeast Power Coordinating Council
SPP Southwest Power Pool
Affiliate ASCC Alaska Systems Coordinating Council
ERCOT Electric Reliability Council of Texas
MAAC Mid-Atlantic Area Council
MRO Mid-Continent Area Power Pool
SERC Southeastern Electric Reliability Council
WECC Western Systems Coordinating Council

Figure 2. Three Major Electrical Interconnections of North America



Bonneville Power Administration

The Bonneville Power Administration (BPA) owns and operates 80 percent of the electric transmission system in the Northwest. Obviously, BPA is a key player in coordinating Year 2000 activities in this region and has provided the following information regarding its Y2K activities.

Y2K Preparedness

The Bonneville Power Administration (BPA) has been working since 1995 to prepare for the year 2000 and related dates. In 1995, BPA conducted an inventory of all its automated business systems, identified systems critical to its operations, and began to plan for replacing, upgrading or discontinuing those with Y2K problems. BPA appointed a cross-agency Y2K team with executive-level sponsorship and hired a chief information officer whose major responsibility is leading the Y2K effort and making BPA systems and equipment Y2K ready.

The team developed a year 2000 readiness plan based on a ”defense in depth” philosophy that incorporates five key points:

1) Use of a methodical process to find and fix Y2K problems

2) Increase scrutiny of critical systems' transmission reliability

3) Coordinate with entities that have significant effect on transmission

4) Develop contingency plans for operating the transmission system

5) Develop comprehensive emergency plans

Testing and Remediation

BPA's Y2K testing guidelines were adapted from national standards set by CANUS/ Utilities Services Alliance, Inc., BPA is reviewing all critical equipment for Y2K readiness, including power system control and protection, communications, control centers and business and support systems. Some problems have been found and are being corrected.

BPA's methodical requirements call for every system to be tested, at a minimum, for two dates: January 1, 2000, and February 29, 2000. Global Positioning System (GPS) receivers must also be tested August 21 ñ 22, 1999. More tests may be done as applicable to specific systems. The plan includes thorough documentation and quality control. All testing and remediation is to be done by March 1999.

BPA has made changes to the sub-station control and data acquisition system (SCADA), the equipment at BPA control centers which communicates with and controls transmission operations at 187 of BPA's 363 substations. The SCADA at BPA's Munro control center was updated when the center was moved from Moses Lake to Spokane in 1996, while the Dittmer SCADA was updated in 1998. Testing is currently underway at BPA's testing and training center in Vancouver, Washington and at field sites to determine the readiness of the more than 2,400 pieces of equipment in BPA's system that contain embedded chips.

Contingency Planning

More than 80 percent of BPA's power is hydropower, which is a distinct advantage for Y2K planning and implementation. Hydro plants can be on line in minutes and stay on line longer when power system problems occur. Large thermal plants, by contrast, can take hours to start up.

All BPA control centers, major substations, major generation and large utilities have dedicated communications systems and use analog microwave immune to Y2K problems, plus UHF and VHF radio. Operators also use cellular and dial telephones. BPA can operate the power system manually using people on site as long as voice communication is available.

BPA and other WSCC members are developing a regional contingency plan based on NERC's guidelines. A preliminary draft WSCC Y2K contingency plan was to have been completed before January 1, 1999. BPA is developing its own Y2K contingency plan based on the NERC and WSCC Y2K plans, as well as BPA's emergency preparedness guide and restoration plan. If computer systems fail, local control and protection, such as generation governors and protection relays, can provide backup.

Coordination with Suppliers and Customers

BPA is coordinating with the U.S. Corps of Engineers, the Bureau of Reclamation, and Washington Public Power Supply System to ensure that they provide reliable sources of generation. BPA is also coordinating with customers at all major interconnection points on the system.

January 1, 2000 and BPA's Electric Power Operations

BPA's goal is that homes and businesses in the Pacific Northwest will operate with no electrical disruption on critical Y2K dates. With methodical testing and remediation, thorough contingency planning and coordination with suppliers and customers, BPA is planning for Y2K to be a "non-event" for the region's power system.

Washington Investor-Owned Utilities and the Utilities and Transportation Commission

Companies providing electricity, natural gas and telecommunications are regulated by the Washington State Utilities and Transportation Commission (UTC). Therefore, the UTC is taking steps to ensure that service essential to residents and businesses is not interrupted by Y2K.

The UTC strives to ensure that utility and transportation services are fairly priced, available, reliable, and safe. To accomplish this, the Commission regulates rates, terms and service conditions of investor-owned providers of electrical, natural gas, telephone, solid waste, water, household good moving, private ferry and bus services. It also regulates the safety of railroad companies operating in Washington State.

The UTC **does not** regulate rates or operation of publicly- or municipally-owned utility or transportation services, including city-owned water, sewage or garbage services, or water or electrical service provided by a public utility district or cooperative. Furthermore, the UTC **does not** regulate cellular or wireless telephone or cable television companies.

Electric companies regulated by the UTC in Washington include Puget Sound Energy, Pacificorp, and Avista (formerly Washington Water Power Company).

The purpose of the Commission's Y2K review is to notify network-based companies, such as those that supply electricity, natural gas and telecommunications, that the Commission fully expects they will prepare for Y2K so that service disruptions to customers will be avoided. In light of these expectations, the UTC has:

- Initiated in December 1997, a staff investigation into public service company analysis of Y2K computer issues.
- Conducted in February 1998, a public hearing to receive status reports from major facility-based public utilities on their preparation to provide uninterrupted service. Staff focused their efforts on facility-based utilities because of the direct effect that potential service interruptions would have on customers.
- Ordered in June 1998, the following, based on staff recommendations:

1. Major facility-based public utilities operating in Washington to begin quarterly reporting on the status of their Y2K efforts. The first reports were submitted in June 1998.
2. Utilities to notify their business customers of the need to bring their utility-related equipment into Y2K compliance no later than September 30, 1998.
3. Utilities to submit their Y2K service restoration contingency plans to the Commission for review no later than December 1998.
4. Commission staff to coordinate with other public organizations and the media to ensure information is made available to the public to assist them in their Y2K preparations.

- Ordered utilities to add or update their Internet sites to include a Web page devoted to year 2000 compliance efforts. Information on the page must include quarterly reports filed with the UTC, and other relevant information to assist customers in assessing potential Y2K problems.

Public Utility Districts

The Washington Public Utility District Association reports that it is absolutely committed to "keeping the lights on" and maintaining the reliability of the electric and water systems that public utility districts (PUD) manage in the face of the Y2K challenge.

Whether a PUD is large or small, a generating or non-generating utility, all PUDs are making preparations for January 1, 2000. The integrated nature of the electrical system, however, makes it virtually impossible to issue any assurances as certain parts of the system, such as non-utility owned transmission and generation, are out of any individual utility's control. This makes it imperative that every utility examine and address Y2K shortcomings that are uncovered. Therefore, each association member is working with other utilities, trade associations, vendors, and consultants to be ready for Y2K. PUDs are researching Y2K impacts in several areas. Generation, transmission, distribution, and billing and customer information systems are the key components that have been identified as needing examination, testing and remediation. Each PUD is also going through the following Y2K checklist:

- Inventory systems and applications
- Assess Y2K impact
- Select remedial action, such as upgrades and replacement of equipment
- Establish priorities for modifications
- Identify critical events and establish critical completion dates
- Communicate with customers through bill stuffers, newsletters and board meetings
- Monitor progress and record efforts
- Assess impact from outside sources
- Communicate and work with vendors and suppliers

- Make contingency plans
- Evaluate legal position
-

Member utilities are also planning for their human resource needs for December 31, 1999. Extra work crews and office personnel will be deployed in case Y2K does cause electrical disruption.

Municipal Utilities - Association of Washington Cities

The Association of Washington Cities (AWC) reports that it has developed an aggressive plan to give cities and towns the tools and resources needed to solve their Y2K problems. This plan includes:

- Conducting classroom and on-site training as issues and specific needs emerge. In September 1998, AWC hosted a Y2K awareness-project management workshop in Moses Lake and Tukwila for 220 city and county officials. Workshops on contingency planning are scheduled for January 1999, at the same sites.
- Maintaining a networking resource group for western Washington cities and counties so local governments can share information easily. Eastern Washington cities aren't able to participate as easily; however meeting minutes are e-mailed to those Y2K coordinators. In 1998, the group met with Puget Sound Energy, U.S. West, and U.S. Bank. In 1999, AWC is considering bringing in officials who administer the Federal Emergency Management Act.
- Distributing information quickly via e-mail to more than 130 city and county Y2K coordinators.
- Providing technical assistance through consultants to small cities and towns with less than 5,000 residents. AWC pays a portion of consultant services.
- Collecting inventory items from cities and entering them into a shared database.
- Creating information packets so cities don't have to reinvent the wheel. For example, small cities received sample vendor letter packets and will receive a community awareness kit.
- Working with the state to connect cities into a regional contingency plan so they are in sync with state and county plans.
- Concise monthly updates to heighten Y2K awareness among municipal managers.
- Keeping in contact and sharing information with utilities, public works directors and police and sheriffs associations.

AWC has provided the following descriptions of several key municipally-owned utilities and how they are complying with Y2K preparedness plans:

- **Seattle City Light:** Began Y2K evaluation in 1995. Inventory completed of all software application systems and corrections to identified problems are underway.

New energy management system has been installed and will be tested in March 1999, along with customer accounts, billing and service systems. Meter reading system is to be compliant by June 1999. Contracts of non-compliant vendors are being reviewed. Operational plans in place to handle generation and transmission outages and to activate manual operations. Special staffing plan is being developed for December 31, 1999 to January 1, 2000. Contingency plan to limit import and export of power, although utility will obtain power from the Skagit if necessary.

- **Tacoma Power:** Plan in place based on Western Systems Coordinating Council guidelines to prevent and address any disruption of service caused by city systems. Includes developing an exhaustive inventory of all hardware and software that might be affected by Y2K, including calibration equipment, protective relays, communication and control systems, and financial and billing functions. The city's goal is to have all critical systems Y2K ready by July 1999.
- **Port Angeles City Light:** Conducting inventory of equipment, evaluating priorities and getting documentation from suppliers. The current schedule calls for compliance and a completed contingency plan by June 1999.
- **Centralia City Light:** Does not have a lot of automated equipment, and everything can be manually operated. Software that runs the turbines is Y2K compliant and contingency plans have been completed.
- **City of Ellensburg**: Completed a prioritized list of vital, critical and non-critical services based on the American Public Power Association guidelines. An equipment inventory using the prioritized lists was to have been completed by January 1, 1999.

Rural Electric Cooperatives

The Washington Rural Electric Cooperative Association reports that electric cooperatives and mutuals in the state have been working on becoming Y2K compliant for well over a year now. Many of the co-op systems are well ahead of schedule for completing their testing and system improvements. Most of them started with computers and other office equipment. There have been several major changes of equipment, partly to ensure that systems are Y2K compliant. In addition, co-ops are in the process of addressing Y2K issues with members.

Co-ops have received assistance from a number of government agencies and private companies. Those that borrow from the Rural Utilities Service (RUS) program, which is part of the U.S. Department of Agriculture, were required to file an initial report several months ago and to adhere to a compliance schedule. The National Rural Electric Cooperative Association has hosted training seminars and provided consulting services to help co-ops meet deadlines. In addition, their main private banking partner, the Cooperative Finance Corporation (CFC), has worked with borrowers to make sure they will be ready on time. They have also participated in programs sponsored by the Northwest Public Power Association (NWPPA), the National Energy Reliability Council (NERC), the Electric Power Research Institute (EPRI) and several private companies.

Washington co-ops buy all or most of their power from the Bonneville Power Administration. BPA is also responsible for delivering power to co-ops, which do not own any generation or transmission lines. Consequently, co-ops have been working with BPA to ensure uninterrupted delivery of wholesale power after December 31, 1999.

Co-ops have contingency plans as well, including extra staffing on January 1, 2000. All equipment can be manually operated, which means that if an embedded chip causes a problem, the equipment can still function.

Summary

In the electric utility arena, overall coordination of Y2K issues in the Northwest are being conducted at the national and regional levels by the North American Electric Reliability Council (NERC) and the Western Systems Coordinating Council (WSCC). NERC has set standards and guidelines for each phase of Y2K assessment, testing and contingency planning, and has recommended that government, communications, transportation and other energy-related industries be included in electric companies' Y2K activities. WSCC member utilities report their progress on Y2K programs to NERC monthly and on a quarterly basis regarding their Y2K preparedness activities.

Washington State has some particular advantages and disadvantages regarding Y2K issues. One advantage is that electric industry players that operate in Washington report that they are working diligently on finding and fixing Y2K problems within their generation, transmission, and delivery systems. Electric utilities have found that the majority of their equipment used in power delivery and might be affected by Y2K are at the generation and transmission segments of the industry. Some of the state's major systems, such as the Bonneville Power Administration and Seattle City Light, have been working on Y2K compliance since 1995. Another advantage Washington State has is that the bulk of our electricity comes from hydro power, which is easier to restart than other forms of energy in the event of a power failure. A final advantage is that because of its geographical location, the Northwest will be able to observe the types of Y2K problems occurring elsewhere in the world and in the U.S. before midnight of December 31, 1999, and make adjustments accordingly.

Other Y2K preparedness activities are being conducted by a host of electric industry-related organizations through the state. The Washington State Utilities and Transportation Commission, which regulates privately-owned electricity, communications and transportation entities, has required quarterly reporting of Y2K efforts and contingency plans by those industries. Public utility districts are going through detailed preparedness checklists and have plans for additional staff to be on hand during critical Y2K dates. The Association of Washington Cities has a comprehensive Y2K program and is working with municipally-owned electric utilities, including Tacoma, Seattle, Ellensburg, Centralia, and Port Angeles, to coordinate plans with utilities, city managers, public works directors and other city officials. Meanwhile, most rural electric cooperatives, with the help of public and private partners, are reportedly ahead of schedule in Y2K testing and compliance.

Washington State also has some particular disadvantages regarding Y2K compliance. First, because of the great number and variety of institutions that are responsible for electric service throughout the state, coordination and accountability may be challenging. There is no state wide mechanism for ensuring that electrical systems meet compliance deadlines. The nature and extent of potential interruptions in power supply and delivery are difficult to foresee with accuracy. Additional challenges include non-compliant suppliers and vendors to electric systems and confidence in the accuracy of reporting

among those who have submitted information to electric utilities. For example, one of the state's largest utilities, Seattle City Light, has only begun to address the issue of non-compliant vendors while Port Angeles City Light reports that only 50 percent of suppliers have submitted Y2K documentation and that some of the information is suspect. Finally, while many utilities have ensured that equipment can be operated manually, it is unclear whether personnel have been given the training to do so.

In conclusion, it is imperative for smooth continuation of electricity delivery into the new millennium that electric utilities operating in Washington State continue thorough Y2K planning efforts as called for by national industry guidelines. In addition, utilities must continue to work closely with their customers and vendors to ensure that all elements of providing electric power in the Northwest are as prepared as possible for the Year 2000 transition.

Electric Utility Y2K Websites

Electric Utilities and Year 2000	http://www.euy2k.com
EPRI Year 2000 Issues for Embedded Systems	http://year2000.epriweb.com/index.html
North American Electric Reliability Council	http://www.nerc.com/y2k/y2k.html
Washington Utilities and Transportation Commission	http://www.wutc.wa.gov/y2k
Washington State Department of Information, Services Y2K Program	http://www.wa.gov/dis/2000/aw

DOT, cities, and counties should provide opportunities for safer and more accessible bicycle and foot transportation directly into core city areas.	DOT	The DOT Bicycle and Pedestrian Program has created the Bicycle and Pedestrian Chapter of the Washington Transportation Plan. The Plan aims to double bicycle and pedestrian trips, and to reduce accidents. DOT has established partnerships with local governments, transit agencies, and the Transportation Improvement Board. DOT has secured $3 million to address dangerous student walk routes.
DOT should develop a specific proposal for a congestion pricing pilot program, whereby users of highways would be charged during peak period.	DOT	DOT considered a Congestion Pricing Project under its Public Private Partnerships initiative. The project did not attract the requisite public or legislative support necessary for success, and it was not implemented.

Developing Substitutes for Transportation		
The Washington Utilities and Transportation Commission (UTC) should work with WSEO *(now WSU)* to assess the long-term ability of communications technology to substitute for transportation.	UTC WSU	Communications technology has changed rapidly since the Energy Strategy was adopted. The rapid market penetration of personal computing, the World Wide Web, and higher capacity telecommunications mean these technologies are increasingly available as substitutes for transportation. Government agencies and intitutions of higher education are using telecommunications technology to reduce travel by increasing the use of video conferencing and distance education.
The State should encourage the establishment of centralized "telework centers" in urban and suburban areas.	DOT WSU	No current activity
The State should locate significant State office facilities in non-metropolitan areas, using telecommunications to provide needed information links.	GA	The State now has three workstations at the North Cascades Gateway Center in Sedro Woolley, two sites at the Washington State Training and Conference Center in Burien, and sites in Yakima, Kelso, Tacoma, and Everett.
The State should develop a model telecommuting program and policies that could be adapted by government agencies and the private sector.	WSU GA	Completed and available through GA as part of State Government CTR Guidelines.
The Department of Information Services (DIS) should continue to work with public and private organizations to use interactive technologies as an alternative to travel.	DIS	DIS/Washington Interactive Technologies (WIT) operates a statewide network of six videoconference centers. The knowledge gained in launching the WIT network was utilized in developing the K-20 network, which will equip almost 600 schools and universities with videoconferencing and access to the internet. WIT's award winning bridging network provides connectivity to videoconferencing rooms worldwide. In addition agencies are using WIT's interactive satellite broadcast services to provide training for large audiences over the entire NW region of the US. These services have resulted in estimated cost savings of over 13 million dollars, primarily through reduction of State agency travel costs, since WIT's inception in 1993. Currently WIT is working to assist in reducing travel costs further by developing new on-line, and just-in-time training services that will be accessible from each individual State employee's workstation. In addition DIS is working to make government more accessible to State citizens through interactive technology and the internet.
The UTC and telecommunications companies should consider tariffs to encourage widespread access to services providing simultaneous transmission of voice and data.	UTC	UTC approved tariffs for ADSL (Asymmetrical Digital Subscriber Line) on July 9, 1998 to improve voice/data transmission for US West. GTE is expected to file a tariff for the same service soon. ADSL technology will have highest impact in metropolitan areas due to some physical limitations that make it impractical in more rural areas.

Using Alternative Fuels		
The Department of Ecology (DOE), GA, and WSEO *(now WSU)* should work together to ensure that current State purchasing requirements for clean-burning vehicles fit federal mandates.	DOE GA WSU	These agencies continue to work closely with federal agencies that are developing alternative fuel vehicle requirements. GA now has alternative fuel vehicles on State contract. This contract is available to state agencies and all public subdivisions
The State should develop the infrastructure necessary for alternative fuel experiments. WSEO *(now WSU)* should track those experiments.	WSU	WSU successfully teamed with the City of Seattle and other local jurisdictions to form the Puget Sound Clean Cities Coalition.
The public should be advised on conversions of private vehicles to a specific alternative fuel only when results of alternative fuel experiments are clearly known.	WSU	The WSU Energy Program alternative fuel activities include the follo wing: Working with regional natural gas utilities (Puget Sound Energy, BC Gas, Northwest Natural Gas and Washington Water Power) to explore ways of creating a compressed natural gas fueling corridor along I-5; Implementing a universal fuel card system to allow networking of existing and future natural gas fueling stations in the Puget Sound area: Supporting Sound Transit investigation of advanced technology buses; Setting up a demonstration program with King County/ Metro to investigate the feasibility of operating natural gas vanpools; Setting up a demonstration program with Seattle City Light to investigate the use of electric vehicles; Working with University of Washington to explore the use of neighborhood electric vehicles (NEVs) for on-campus applications; Working with WSDOT to allow commute trip reduction credits for alternative fuel vehicles; Supporting the City of Spokane alternative fuel market activities including the creation of the Northwest Inland Empire Clean City Coalition; and Reporting Washington State alternative fuel vehicle acquisitions to the U.S. Department of Energy as required by the National Energy Policy Act.
DOE should develop emissions performance standards for alternative fuel vehicles.	DOE	Ongoing. Washington State is purchasing low-emission vehicles based on its performance standard. Over 1000 vehicles have been purchased using this standard.
WSEO, DOT, and the Department of Revenue (DOR) should better define "alternative fuels" and establish a clearer basis than now exists for differential tax treatment.	DOT DOR	No current action.
WSEO and DOE should explore the development of a cooperative West Coast (British Columbia, Washington, Oregon, and California) effort to ensure maximum learning, minimal duplication of effort, and development of a larger market for low-emission vehicles.	DOE	Ongoing. The West Coast agencies are in close contact regarding alternative-fuel vehicle actions and anticipate working together on an emissions labeling effort. British Columbia is looking at adopting California emissions standards. State agencies are investigating options for a "green car" purchasing compact.

Improving Freight Mobility		
The UTC should work to improve the energy efficiency of the trucking industry by developing regulatory mechanisms that promote cost-effective and efficient use of fuel.	UTC	No action; State regulation of trucking was abolished by federal legislation.
The State should revitalize the state rail abandonment program to avoid further railroad right-of-way losses and, where appropriate, purchase and preserve abandoned rights-of-way for use as transportation corridors.	DOT	DOT has an ongoing Rail Banking Program by which abandoned rail corridors are bought and banked for future use. Examples are Yelm to Tenino; Othello to Royal City; and White Swan to Toppenish.
DOT should examine ways to promote broader use of rail freight options.	DOT	Legislation required DOT to establish a Freight and Goods Transportation System. This is now in progress. DOT is exploring establishing a Tacoma to Everett "FAST" Corridor to expedite freight via grade separation and dedicated rights-of-way. Governor Locke has appointed a Freight Mobility Strategic Investment Board to determine the best approach to facilitating freight movement.
Improving Vehicle Efficiency		
The State should seek our Congressional delegation's support for increased federal Corporate Average Fuel Efficiency (CAFE) standards.	DOT DOE	No current action.
The State should propose that the western states expand purchasing consortia to include vehicle fleet purchases, with the aim of stimulating auto manufacturers to develop safe, higher-mileage, and lower-emission vehicles.	GA	***GA works closely with DOE and its Green Vehicle Program, which addresses low-emission certified vehicles.***
DOR, Licensing, and WSEO should develop a proposal for the 1994 legislative session to change the current license registration and excise tax system, so that it charges less for vehicles with better mileage/emissions performance and more for vehicles with poor performance.	DOR DOL	The registration and tax system was not changed to an efficiency basis. No current action is planned.
Funding Alternatives		
The State should examine all transportation funds and reprogram the funds to promote efficiency goals.	DOT UTC	Reprogramming or realigning transportation funds would require legislative approval and possibly a constitutional change to the 18th amendment. These actions have not been taken.

The State should realign existing taxes to reinforce policy goals, particularly to ensure that tax structures do not provide incentives to increase vehicle miles traveled, increase emissions, or decrease vehicle efficiency.	DOT Legislature	Reprogramming or realigning transportation funds would require legislative approval and possibly a constitutional change to the 18th amendment. These actions have not been taken. In 1998 the Legislature authorized Referendum 49 which would reduce motor vehicle excise taxes be reduced and reallocate state revenues reallocated; approve $1.9 billion in bonds for state and local highways; and modify spending limits. This referendum passed with a 58% approval rating.
The State should take advantage of available federal funds for developing new programs or technologies.	DOT	Continuing effort. DOT aggressively seeks federal demonstration, research and other funds. DOT has been particularly successful in attracting federal Intelligent Transportation System funds for various projects.
The State should raise new revenue by taxing the commodity or activity causing the problem. Revenue alternatives that merit consideration include: raising the fuel tax; extending the sales tax to sales of vehicle fuels; repealing tax exemptions for alternative fuels; and repealing the 18th Amendment to the State constitution so that existing gas tax money may be used for other transportation needs besides highways.	DOT Legislature	These actions have not been taken. In 1998 the Legislature authorized Referendum 49 which would reduce motor vehicle excise taxes and reallocate state revenues; approve $1.9 billion in bonds for state and local highways; and modify spending limits. This referendum passed with a 58% approval rating.

Growth Planning for Energy Efficiency		
DOT and WSEO *(now CTED and WSU)* should jointly develop a technical assistance program for local planners on the energy implications of different growth planning strategies.	CTED WSU DOT	The three agencies jointly publish a manual entitled, "Energy and the Growth Management Act: Model Language for Local Governments' Comprehensive Plans." The Energy Policy Group is now located in CTED along with as Growth Management and participates in the Growth Management Interagency Working Group. WSU continues to develop computer models related to community utility infrastructure.
WSEO *(now CTED and WSU)* should work with other interested parties to develop models for planners that demonstrate energy implications of alternative urban designs; help local governments enact solar ordinances; and advocate comprehensive plans that preserve opportunities for efficient renewable energy projects.	CTED WSU	WSU provides technical assistance in the areas of combined heat and power and district energy, as well as renewable resource development. The Energy Policy Group is now located in CTED along with Growth Management and participates in the Growth Management Interagency Working Group.

ENERGY FOR BUILDINGS, FARMS, INDUSTRY

Natural Gas Planning		
The State's gas utilities should work closely with CTED and the UTC to develop and implement comprehensive least-cost planning.	UTC CTED	All gas utilities have least cost plans on file.
Gas utilities should implement cost-effective conservation measures and programs in their service territories consistent with their least-cost plans.	UTC CTED	Puget Sound Energy has a small program for natural gas demand side management including an information-based program and a water heater rebate program. Washington Water Power (WWP) has no conservation programs for natural gas; however, it does have a tariff-rider funding mechanism in place should cost-effective conservation actions be identified. Cascade Natural Gas Co. and Northwest Natural Gas companies do not have DSM tariffs on file and have negligible programs for achieving energy efficiency in their Washington service territories. The declining cost of natural gas means that fewer measures are cost-effective.
The State's electric and gas utilities should work closely with WSEO (*now CTED*) and the UTC to integrate their least-cost planning.	UTC CTED	Puget Sound Energy, which serves the Puget Sound area, is producing two plans – one for gas and one for electricity customers. WWP, which serves parts of Washington near Spokane, has two plans. In neither case are these plans integrated across fuels.
WSEO (*now CTED*), in cooperation with UTC, utilities, the Bonneville Power Administration (BPA), and the Northwest Power Planning Council (NWPPC), should provide a report to the Governor and Legislature clearly identifying the nature and extent of savings available from cost-effective fuel choice.	UTC CTED	The report "Fuel Blind Integrated Resource Planning Project" was published. There has been no recent activity on this strategy.
UTC should change its line extension policy to develop new pricing methods to permit recovery of costs from lower volume lines.	UTC CTED	Line extension tariffs are on file for each company.

The State should encourage electric utilities to consider fuel choice as a resource in their least-cost planning and to implement appropriate programs.	UTC CTED	Many utilities are reluctant to pursue aggressive fuel switching programs due to potential loss of revenue. Snohomish PUD, Puget Sound Energy and Washington Water Power (WWP) are the only utilities that have implemented fuel-switching programs. PSE offers this service to a limited number of low-income customers under its non-tariff program. WWP continues to offer information to guide consumers to switch to natural gas. WWP funds a low-income weatherization program that implements fuel switching to natural gas for qualifying structures. The Northwest Energy Efficiency Alliance has funded a project to work with low-income residents and Housing Authorities that includes support for fuel switching as cost-effective for these consumers.
The State should encourage BPA to review its new experimental fuel choice program and refine it where it can be shown that fuel choice is cost-effective and reduces the need to use gas for electricity generation.	NWPPC UTC CTED	BPA is allocating $15-30 million per year on energy efficiency activities. This is a drop from several hundred million dollars per year in the past. It is unlikely that these limited funds will be allocated to fuel switching activities.
The State's gas a nd electric utilities should provide clear information to support cost-effective fuel choices.	UTC	Under restructuring, utilities are providing information to builders. The majority of units now use gas for heating if it is available, which coincides with expectations based on cost. The UTC no longer regulates this activity.
Gas Policy and Siting		
WSEO (*now CTED*), in coordination with the state's electric and gas utilities and customers, should develop regular statewide estimates of natural gas use.	CTED	This activity is ongoing as part of the Washington State Energy Use Profile.
WSEO (*now CTED*) and the Department of Natural Resources (DNR) should closely monitor coal bed methane to determine its potential as an indigenous gas supply that could be developed without new interstate pipeline capacity.	DNR CTED	Although the last well into a coal bed was plugged and abandoned in 1993, DNR continues to monitor for interest.
WSEO (*now CTED*) should develop ways to track the efficiency of natural gas use in the state.	CTED	Natural gas consumption and price are tracked on an ongoing bases as part of CTED's energy indicators project.

Conservation in Use of Electricity		
The State should support the aggressive pursuit of all cost-effective conservation and efficiency opportunities in both public and private utility markets.	UTC WSU CTED	The pursuit has become less aggressive recently, for a variety of reasons. Competitive pressures induce cost cutting -- including investments in conservation and efficiency projects -- in order to reduce immediate rates. It is for this reason that BPA, once the major funder of public utility efficiency projects, no longer does so. For the same reason, these public utilities are reducing their spending in all areas. Competitive pressures also induce companies to measure efficiency investments against investments such as mergers and acquisitions, which may have higher rates of return.
The State should support the effort to develop and implement regulatory approaches that align private utilities' financial interests with the successful implementation of their least-cost plans.	UTC CTED	This recommendation has been overwhelmed amidst discussions of restructuring. Some industry leaders theorize that a fully functional competitive industry would send the appropriate price signals to encourage efficient use of energy. Other leaders would pursue an approach like that adopted by PacifiCorp in Oregon (summer, 1998) which disassociates revenue earned from kilowatt-hours sold.
BPA should develop better incentives and market conditions to ensure the successes of conservation investments in service areas of public utilities -- both larger utilities in major urban growth areas and smaller utilities in slow-load growth areas.	CTED	CTED has long supported BPA taking a larger role in conservation and other public purposes and has worked, the NWPPC, the Comprehensive Review, the Transition Board and in BPA forums and work groups to encourage BPA to do so. BPA's rate discount proposal as part of Subscription is a welcome step in the right direction since it meets the strategic objective of providing incentives for conservation to all of its utility customers.
The State should regularly revise state commercial and residential building codes to achieve the region's conservation targets.	CTED	The non-residential energy code underwent its last major revision in 1994. The residential code was partially revised in 1997, but retained most of the energy efficiency provisions included in the 1991 version. The next scheduled code revision cycle will be in 1999-2000, when the State begins to shift to the new codes developed by the International Code Council. CTED will keep informed of energy code developments by way of Building Code Council staff and WSU.
BPA and the investor-owned gas and electric utilities should include the cost of supporting code implementation (education, training, and enforcement) as a high priority for funding.	UTC CTED WSU	BPA and the investor owned utilities fund the NEEA. NEEA is actively promoting energy efficient building practices. There may be limited funds available to support code development or code analysis as part of promoting efficient building practices. Neither utilities nor BPA is currently funding code enforcement; there are no plans for them to fund future enforcement.

The NWPPC, WSEO *(now WSU)*, UTC, BPA, and utilities should cooperate in the development of a set of standard and uniform principles for evaluating cost-effectiveness and verifying the performance of BPA and utility financed conservation measures.	UTC CTED WSU	The NWPPC is working with BPA and other energy partners in the region to create a Regional Technical Forum (RTF). Its responsibilities include developing standard evaluation methodologies, and verifying or tracking energy conservation in the region. They may also be charged with developing BPA's energy efficiency subscription option. CTED staff provided comments and testimony supporting the RTF.
The State and region should take full advantage of all federal funds available for supporting conservation technology transfer and demonstration.	CTED DOE WSU	The WSU Energy Program has competed well in bringing new federal funds into the state for energy projects. WSU has received five new U. S. Department of Energy special projects for FY99. Funding for these projects is competitive, and Washington has traditionally done very well in competition. WSU is negotiating to host the national codes conference in Washington in 1999. CTED continues to provide policy support to the U.S. Department of Energy and the U.S. Environmental Protection Agency for energy efficiency and renewable energy programs.
The State Board for Community and Technical Colleges and the Higher Education Coordinating Board should develop curricula and provide training and certification programs for energy-related specializations.	WSU	No current activity.
The State should vigorously pursue programs that ensure that the public buildings are constructed and operated to use energy efficiently.	GA	Revised Energy Life Cycle Cost Analysis Guidelines for public agencies were published in 1998. All guidelines and spreadsheets are now available via the Internet at www.ga.wa.gov/eas/elcca. GA is actively promoting building commissioning through a pilot project with K-12 schools, higher education, cities, counties, state and federal agencies. GA manages the Plant Operations Support Program, a consortium of facilities managers and operators who share informative and operationally oriented information with other facility managers. Additional information is available at http://www.ga.gov/plant/plantops.htm.

Improving System Efficiencies		
The State should support cooperative multi-state analyses of the opportunity for greater seasonal electricity exchanges along the Pacific Coast.	UTC CTED	The western region has had an active wholesale power market for many years, now supported and encouraged by FERC through its Order 888. While development of a western region Independent Grid Operator (IndeGo) has stalled, the west already benefits from open wholesale markets. One mitigating factor, however, has been the derating of the Pacific Intertie due to concerns over system reliability. The Western Systems Coordinating Council is responsible for these system operating parameters. The UTC participates in ongoing regional and national discussions, through National Association of Regulatory Utility Commissioners, aimed at assuring continued system reliability as more players participate in the wholesale market. The UTC actively followed and commented on the development of the IndeGo proposal and now is tracking discussion of the next potential regional body called an Independent Grid Scheduler.
BPA should improve policies to boost access to interstate transmission lines and should examine shared ownership options.	UTC CTED	Bonneville has implemented open access transmission to a significant degree. The formation of a regional independent grid operator has been investigated but activities were terminated primarily because of cost shifting concerns. FERC may decide to order formation of such entities. BPA was a participant in the development of the IndeGo proposal, despite the fact that it expressed doubts over its authority to physically join such an organization.
The U.S. Bureau of Reclamation and the U.S. Army Corps of Engineers should include turbine efficiency improvements in their budgets and promptly implement measures, in view of rising regional power demand and the low cost and impact of these resources.	NWPPC	No current action. The Corps and the Bureau have implemented turbine efficiency improvements when funding has been available. An up-to-date compilation is not yet available.
Renewable Energy Sources		
Utilities and BPA should experiment with targeted solicitations for renewable resources that are nearly competitive with gas.	CTED	This recommendation is outdated based on changes in the industry since the Energy Strategy was written. BPA has created the Bonneville Environmental Foundation to fund investments in renewable energy resources and to market that power to customers. Other Northwest utilities are investigating "green power" development and purchases. CTED is tracking developments and encouraging renewable resource development and policies.

NWPPC, BPA, UTC, and utilities should move quickly to improve their ability to evaluate the full range of benefits from renewable energy technologies.	WSU UTC CTED	The NWPPC continues to inventory and evaluate renewable energy projects and technologies. WSU's energy program remains the main State level involvement in biomass, photovoltaics, geothermal, and related renewable energy technologies CTED and the UTC are developing a report to the Legislature in response to Senate Bill 6560 of the 1998 session that will address current levels of investment in renewable resource technologies in the region.
The State should consider renewable energy projects, such as wind turbines, suitable on parcels of land designated as range land or open space.	DNR CTED Fish & Wildlife	Agencies worked with the DNR to quantify the value of State owned land that could be used for wind energy development. Counties are currently taxing wind farm land at rates that do not discourage wind energy development. No further action seems needed at this time.
Non-utility Fuels		
The State should support wide dissemination to homeowners and building operators of information describing practical opportunities to improve the efficiency of buildings using petroleum, coal, and wood.	WSU	WSU's Energy Ideas Clearinghouse program, funded by the Northwest Energy Efficiency Alliance, provides a wide range of information and technical assistance on energy efficiency opportunities for builders and operators of commercial, industrial, and residential facilities in the northwest, including those using petroleum, coal, and wood.
The State should support actions to improve efficiency in the use of non-utility fuels in public buildings.	GA WSU	Through the Energy Life Cycle Cost process, GA staff work closely with public entities and their consultants to ensure renewable resources are seriously considered when doing energy life cycle cost analyses of new construction projects and remodels.

Low-income Assistance		
The State should support funding that addresses the energy needs of low-income citizens.	CTED UTC	The UTC supports the concepts of on-going public purpose spending as outlined in the Regional Review. All three investor-owned utilities have demand side management programs, which contain low-income assistance components. CTED is working with the Affordable Housing Advisory Board to integrate residential energy efficiency services with other affordable housing programs. The Housing Trust Fund received an appropriation for the 97-99 biennium for weatherization. The appropriation matches funds from utilities, rental owners and other entities. CTED also participated in utility collaboratives and technical advisory groups during demand side management planning. It supported funding of The Energy Project, a joint leveraging/education effort between CTED and the Association of Community Action Agencies. Future activities include: 1) Justify continued Housing Trust Fund funding. 2) Support continued funding and activities of The Energy Project. 3) Support increased federal funding, including BPA funds.
CTED should work with WSEO, the AG's Office, and electric and gas utilities to ensure that low-income weatherization programs address energy savings for the largest number of low-income citizens possible.	CTED UTC	As reported above, CTED has worked this biennium and continues to work with: • Affordable Housing Advisory Board • UTC • Utility collaboratives and technical advisory groups • Interagency Energy Strategy Working Group • BPA
Energy Education		
The State should support education activities that increase the energy literacy of Washington citizens.	CTED WSU SPI	CTED is advocating for utilities to fund K-12 resource education programs that address energy education. CTED is requesting that PSE modify PSE's current education program to change it from a program offered by consultants to a program that trains teachers to provide the curriculum. CTED is supporting WWP/Avista's efforts to develop a K-12 education program to enhance its resource conservation manager program in the schools. CTED is also conducting some secondary research into the role of education and marketing in achieving conservation and renewable resource development. WSU provides fact sheets, a library, education and training for a fee, and a web site. No current activity by SPI.

The Legislature should provide funds to SPI to produce the second phase of the "Energy, Food, and You" curriculum.	SPI	Funding was not provided. Information in the curriculum is now seriously out of date.
WSEO *(now CTED and WSU)* should survey utilities and building operators and advise the Higher Education Coordinating Board about what programs should be developed to train technicians and system operators for conservation and efficiency work in the residential, commercial, and industrial sectors.	CTED WSU	The Northwest Energy Efficiency Council (NEEC) is now offering a comprehensive building operator training program supported with funds for the NEEA. This program includes coordination and cooperation with the State's community colleges and vocational/technical schools.
The State's universities should examine their engineering and architecture programs to ensure that tomorrow's professional graduates are prepared to design facilities of all kinds with energy use in mind.	WSU HEC	WSU Energy Program staff has contacted WSU's Interdisciplinary Design Institute (IDI), a fifth year architecture program that includes construction management, interior design, and landscape architecture, to explore the possibility of including energy and resource conservation in their curriculum. WSU Energy Program could provide guest lectures, conduct energy and resource conservation presentations, seminars, and workshops; serve as a resource for students; work with IDI on internships, special projects, independent studies, and collaborate in research activities. Although both WSU programs were enthusiastic about the possibility of working together, the details and logistics are still being worked out.
Higher education programs should include energy education units in pre-service and in-service teacher training.	HEC	No current activity.

PROTECTING OUR ENVIRONMENT

Carbon Dioxide and Global Warming		
WSEO *(now WSU)* should develop a more comprehensive inventory and projection of carbon dioxide and other greenhouse gas emissions and identify the most cost-effective measures for meeting emissions targets.	DOE WSU CTED	DOE has a multiphase program underway. Phase 1 – Inventory and projection of greenhouse gas in Washington completed. Phase 2 – Greenhouse gas mitigation Option for Washington State completed. The "Greenhouse Gas Emissions Inventory for Washington State, 1990," was published by WSEO in 1994. WSU has completed a brief update of that document which brings the emissions data up to 1995.
The State should urge our Congressional delegation to support a national carbon dioxide and greenhouse gas emission target.	DOE CTED	As part of the 1997 Kyoto protocol on greenhouse gas reduction, U.S. negotiators agreed to reduce U.S. emissions to 7% below a 1990 baseline by the period 2008-2012. Ratification of the treaty is not expected to occur until 2000, at the earliest. CTED working with other state and federal agencies and nonprofit groups to promote policies which reduce greenhouse gas emissions while expanding the state's energy efficiency and renewable energy industry.
Environmental Regulation and Energy Decision Making		
BPA and the State's electric utilities should incorporate quantifiable costs, including environmental costs, into least-cost planning and modeling.	UTC CTED	No current action. In 1999 the UTC will be conducting a review of its Integrated Resource Planning rules as contained in WAC 480-107 in compliance with the Governor's executive order. BPA considers some environmental costs in its least cost planning. However, it argues that the opening of the competitive wholesale power market has made consideration of environmental costs very difficult. Otherwise, the majority of utilities in Washington State are not doing this. As of this writing, utility least cost plans indicate no new resource needs for a period of 10-15 years.
The State encourages more comprehensive assessment of environmental costs in all energy sectors, not just electricity planning.	UTC CTED	No recent progress on this recommendation.

Siting Energy Facilities		
The Governor should instruct his cabinet to focus its attention on implementing the provisions of the State energy strategy using existing rules, but avoiding costly duplication and ensuring rapid decision making.	CTED (EFSEC)	Executive Order 94-01 and Chapter 207, Laws of 1994 make the Energy Strategy the primary guide for implementing the State's energy policy.
WSEO *(now CTED)* should take the lead in ensuring that supply and conservation projects consistent with the strategy receive fair and rapid treatment by the many state, federal, and local agencies that must review them.	CTED (EFSEC)	EFSEC provides a coordinated one-stop siting process for energy facilities 250 megawatts or greater. Local governments shall appoint members to EFSEC when the energy facility is in their jurisdiction.
BPA and investor-owned utilities should consider funding generic impact investigations, particularly for renewable technologies, so as to narrow the number of issues requiring study during actual siting.	UTC CTED	In a restructured electric utility environment, private energy developers (merchant plants) may be predominant in the development of energy facilities, not BPA or regulated utilities.
The Legislature should form a siting review panel, similar to the State Environmental Policy Act Review Panel of 1982-83, to develop revised state siting procedures and legislation to implement them.	CTED (EFSEC)	Completed. No legislation was passed.

Effective July 1, 1996, legislation closed the Washington State Energy Office and transferred its programs and functions to the following agencies:

Energy resource policy and planning; administration of energy program grants; and the Energy Facility Site Evaluation Council.	**CTED**	Department of Community, Trade & Economic Development; Energy Division	http://www.energy.cted.wa.gov
Energy efficiency work related to public sector facilities.	**GA**	Department of General Administration	http://www.ga.wa.gov/eascust.htm
Support programs and resources for carrying out the CTR law, including administrative support for the CTR Task Force.	**DOT**	Department of Transportation	http://www.wsdot.wa.gov
Energy programs focusing on energy resources, applied research, industrial, software, telecommunications, education/information, technology transfer, public sector training and technical assistance, energy codes and the Energy Ideas Clearinghouse.	**WSU**	WSU Energy Program	http://energy.wsu.edu

Abbreviations and Websites for Agencies with responsibilities for recommendations in Washington's Energy Strategy

CTED	Department of Community, Trade & Economic Development, Growth Management Services	http://www.cted.wa.gov/growth
UTC	Utilities and Transportation Commission	http://www.wutc.wa.gov
DOE	Department of Ecology	http://www.wa.gov/ecology/
DIS	Department of Information Systems	http://www.wa.gov/dis
DOR	Department of Revenue	http://www.wa.gov/DOR/wador.html
SPI	Superintendent of Public Instruction	http://www.ospi.wednet.edu
NWPPC	Northwest Power Planning Council	http://www.nwppc.org
DNR	Department of Natural Resources	http://www.wa.gov/dnr/
HEC	Higher Education Coordinating Board	http://www.hecb.wa.gov
DOL	Department of Licensing	http://dol.wa.gov/

Appendix A: List of Acronyms and Abbreviations

List of Acronyms and Abbreviations

	Acronym	Definition
A	ADSL	Asymmetrical Digital Subscriber Line
	AG	Washington State Attorney Generals Office
	aMW	Average Megawatt
	AWC	Association of Washington Cities
B	Bonneville	Bonneville Power Administration
	BPA	Bonneville Power Administration
	BTU	British Thermal Unit
C	CAFE	Corporate Average Fuel Efficiency
	CFC	Cooperative Finance Corporation
	COOPS	Rural Electric Cooperatives
	Council	Energy Facility Site Evaluation Council (EFSEC)
	CT	Combustion Turbine
	CTED	Washington Department of Community, Trade and Economic Development
	CTR	Commute Trip Reduction
D	DIS	Washington Department of Information Service
	DNR	Washington Department of Natural Resources
	DOE	Washington Department of Ecology
	DOR	Washington Department of Revenue
	DOT	Washington State Department of Transportation
	DSM	Demand Side Management
E	ECAR	East Central Area Reliability Council
	EFSEC	Energy Facility Site Evaluation Council
	EPRI	Electric Power Research Institute
	ERCOT	Electric Reliability Council of Texas

F	FCRPS	Federal Columbia River Supply System
	FERC	Federal Energy Regulatory Commission
	FRCC	Florida Reliability Coordinating Council
G	GA	Washington Department of General Administration
	GPS	Global Positioning System
	GSP	Gross State Product
H	HOV	High Occupancy Vehicle
	HVAC	Heating, Ventilation and Air Conditioning
I	IDI	Interdisciplinary Design Institute
	IndeGO	Independent Grid Operator
	IOU	Investor Owned Utility
M	MAAC	Mid-Atlantic Area Council
	MAIN	Mid-America Interconnected Network
	MAPP	Mid-Continent Area Power Pool
	MPG	Miles per gallon
	MW	Megawatt
N	NARUC	National Association of Regulatory Utility Commissioners
	NEEA	Northwest Energy Efficiency Alliance
	NEEC	Northwest Energy Efficiency Council
	NERC	North American Electric Reliability Council
	NEV's	Neighborhood Electric Vehicles
	NPCC	Northeast Power Coordinating Council
	NRPF	Northwest Regional Power Facility
	NWPP	Northwest Power Pool
	NWPPC	Northwest Power Planning Council
O	OFM	Washington State Office of Financial Management
	OPEC	Organization of Petroleum Exporting Countries

P	POU	Publicly Owned Utility
	PPC	Public Power Council
	PSE	Puget Sound Energy
	PUD	Public Utility District
R	RCW	Revised Code of Washington
	RTF	Regional Technical Forum
S	SCADA	Substation Control & Data Acquisition System
	SERC	Southeastern Electric Reliability Council
	SPP	Southwest Power Pool
	SPI	Superintendent of Public Instruction
	SQI	Service Quality Index
	Supply System	Washington Public Power Supply System (WPPSS)
U	UTC	Washington Utilities and Transportation Commission
V	VMT	Vehicle-miles traveled
	WIT	Washington Interactive Television
W	WNP	Washington Nuclear Project
	WNP-1	The Supply System's terminated nuclear plant at Ha nford
	WNP-2	The Supply System's operating nuclear plant at Hanford
	WNP-3	The Supply System's terminated nuclear plant at Satsop
	WNP-4	The Supply System's terminated nuclear plant at Hanford (on the same site as WNP-1)
	WNP-5	The Supply System's terminated nuclear plant at Satsop (on the same site as WNP-3)
	WPPSS	Washington Public Power Supply System
	WSCC	Western Systems Coordinating Council
	WSEO	Washington State Energy Office (closed June 30, 1996)
	WSU	Washington State University
	WWP	Washington Water Power
Y	Y2K	Year 2000

Appendix B: Utilities Serving Washington State Customers

Utility	Class of Ownership	Cust. Accts.	Revenue $1,000s	kwh sales (1000s)	Avg revenue ¢ per kWh
Puget Sound Energy	Investor-Owned	864,463	1,156,807	20,363,370	5.68
Seattle City of	Municipal	339,032	362,711	9,247,887	3.92
PUD No 1 of Snohomish Cour	PUD	241,262	277,217	6,172,086	4.49
Washington Water Power Co	Investor-Owned	198,845	235,497	4,723,922	4.99
Tacoma City of	Municipal	140,466	192,869	5,552,961	3.47
PUD No 1 of Clark County	PUD	134,339	153,671	3,769,962	4.08
PacifiCorp	Investor-Owned	114,615	177,100	3,955,591	4.48
PUD No 1 of Cowlitz County	PUD	42,713	100,982	4,271,165	2.36
PUD No 1 of Benton County	PUD	39,158	62,153	1,594,476	3.90
PUD No 2 of Grant County	PUD	38,538	63,069	2,744,579	2.30
PUD No 1 of Grays Harbor Cn	PUD	38,423	45,719	994,271	4.60
PUD No 1 of Chelan County	PUD	36,818	35,921	1,343,310	2.67
Inland Power & Light Co	Cooperative	28,114	30,388	590,695	5.14
PUD No 1 of Clallam County	PUD	27,432	25,499	516,438	4.94
PUD No 1 of Lewis County	PUD	26,874	27,226	720,349	3.78
PUD No 3 of Mason County	PUD	26,358	27,966	543,440	5.15
Peninsula Light Co	Cooperative	24,507	24,073	458,347	5.25
PUD No 1 of Okanogan County	PUD	19,520	18,742	604,370	3.10
PUD No 1 of Franklin County	PUD	17,473	28,019	677,242	4.14
Richland City of	Municipal	17,131	26,961	656,835	4.10
PUD No 2 of Pacific County	PUD	15,522	14,514	276,209	5.25
PUD No 1 of Douglas County	PUD	14,191	14,492	738,341	1.96
Elmhurst Mutual Power & Light C	Cooperative	11,560	10,006	235,828	4.24
Benton Rural Electric Assn	Cooperative	11,129	19,390	376,597	5.15
Orcas Power & Light	Cooperative	10,417	10,697	155,823	6.86
Port Angeles City of	Municipal	9,620	16,237	483,709	3.36
PUD No 1 of Klickitat County	PUD	9,572	13,212	286,906	4.60
Modern Electric Water Co	Cooperative*	9,235	9,051	204,070	4.44
Lakeview Light & Power Co	Cooperative	8,574	9,855	275,342	3.58
Centralia City of	Municipal	8,541	9,267	222,532	4.16
Vera Irrigation District # 15	Cooperative	7,727	7,919	187,804	4.22
PUD No 1 of Pend Oreille	PUD	7,241	18,744	877,259	2.14
Big Bend Electric Coop Inc	Cooperative	7,073	15,633	383,554	4.08
Ellensburg City of	Municipal	6,848	7,605	176,636	4.31
PUD No 1 of Skamania County	PUD	4,778	5,306	108,239	4.90
PUD No 1 of Mason County	PUD	4,550	3,724	59,774	6.23
Parkland Light & Water	Cooperative	3,700	4,431	96,261	4.60
Tanner Electric Coop	Cooperative	3,436	2,848	49,640	5.74
Cheney City of	Municipal	3,317	4,871	99,747	4.88
Ohop Mutual Light Co	Cooperative	3,240	2,999	55,973	5.36
PUD No 1 of Ferry County	PUD	2,979	5,360	115,004	4.66
Columbia Rural Elec Assn Inc	Cooperative	2,931	8,869	215,961	4.11
Steilacoom Town of	Municipal	2,779	2,250	37,000	6.08
PUD No 1 of Kittitas County	PUD	2,608	2,809	56,095	5.01
Milton City of	Municipal	2,598	2,128	50,499	4.21
Okanogan County Elec Coop	Cooperative	2,333	2,224	40,099	5.55
Fircrest City of	Municipal	2,241	2,102	37,792	5.56
Blaine City of	Municipal	2,230	3,297	59,045	5.58
PUD No 1 of Wahkiakum County	PUD	2,112	2,000	35,589	5.62

Utility	Class of Ownership	Cust. Accts.	Revenue $1,000s	kwh sales (1000s)	Avg revenue ¢ per kWh
Nespelem Valley Elec Coop	Cooperative	1,467	1,949	39,388	4.95
Chewelah City of	Municipal	1,230	1,293	22,380	5.78
Cashmere City of	Municipal	1,177	1,394	55,752	2.50
McCleary City of	Municipal	936	1,594	33,876	4.71
Eatonville Town of	Municipal	869	1,009	14,357	7.03
Clearwater Power Co	Cooperative	747	1,008	20,356	4.95
Waterville Town of	Municipal	619	342	11,749	2.91
Coulee Dam City of	Municipal	615	750	17,062	4.40
Sumas City of	Municipal	495	879	14,503	6.06
Ruston Town of	Municipal	401	264	6,472	4.08
Alder Mutual Light Co Inc	Cooperative	226	160	2,979	5.37
Kootenai Electric Coop Inc	Cooperative	48	51	897	*4
Northern Lights Inc	Cooperative	17	13	175	*4
Bonneville Power Admin	Power Marketer	16	246,051	12,405,133	1.98
PUD No 1 of Asotin County	PUD	3	11	230	*4
PUD No 1 of Whatcom County	PUD	1	3,644	162,556	2.24
State Total		**2,608,030**	**3,564,842**	**88,306,489**	4.04

from EIA, Electric Sales and Revenue, 1997

Indented bold type indicates known **generators**. *Italic* indicates *WSCC member*.

4) Electric revenue and sales data are reported by electric utilities in thousand dollars and thousand kilowatt-hours. Average revenues per kilowatt-hour for electric utilities with either less than $100,000 of revenue or less than 1 million kilowatt-hours of sales are not provided because the significance of the data is not sufficient to make the ratio meaningful.

Number of Utilities By Classification		Totals			
19	Municipal	541,145	$ 637,823	16,800,794	3.80
19	Cooperative	136,481	$ 161,564	3,389,789	4.77
23	PUD	752,465	$ 950,000	26,667,890	3.56
3	Investor-Owned	1,177,923	$ 1,569,404	29,042,883	5.40
1	Power Marketer	16	$ 246,051	12,405,133	1.98
12	WSCC mbrs	2,038,200	$ 2,881,460	72,395,604	3.98
		Percentages			
	Municipal	21%	18%	19%	-6%
	Cooperative	5%	5%	4%	18%
	PUD	29%	27%	30%	-12%
	Investor-Owned	45%	44%	33%	34%
	Power Marketer	0%	7%	14%	-51%
	WSCC mbrs	78%	81%	82%	-1%

from Energy Information Administration,Electric Sales and Revenue 1997.

Adapted by WSU Cooperative Extension Energy Program under contract to the WA CTED Energy Policy Unit